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Abundance, Age, Sex, and Size of Sockeye Salmon Catches and Escapements In Southeast Alaska In 1988

by
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and
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State of Alaska
Steve Cowper, Governor

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ABSTRACT

Catch statistics and spawning escapement estimates for sockeye salmon (*Oncorhynchus nerka Walbaum*) in Southeast Alaska in 1988 are summarized. A total of 1,298,083 sockeye salmon were commercially harvested, of which approximately 68% were from southern Southeast Alaska (Districts 101-108). The purse seine and drift gill net fleets harvested the vast majority of sockeye salmon, 49% and 46%, respectively. Purse seine catches were highest in District 104 where 591,285 sockeye were taken. Gill net catches were highest in District 115 where 351,551 fish were harvested. Small numbers of sockeye salmon were also taken in sport and subsistence fisheries; commercial trap and troll fisheries; and in Canadian commercial gill net, subsistence, and test fisheries on the Taku and Stikine Rivers. Four-year-old sockeye salmon (1984 brood year) were the dominant year class taken by the purse seine fleet, and 5-year-old fish (1983 brood year) comprised most of the gill net catch. Large shifts in the age composition of the catches over time were apparent in both the gill net and purse seine fisheries. Females were generally shorter in length than males within specific age classes. Differences in migratory timing were observed across districts and age classes in some fisheries. Spawning escapement estimates are listed for all sockeye salmon spawning systems in the region in which at least 25 fish were seen. The contribution of the 1983 brood year predominated in 62% of the 50 escapement collections. Contributions of the 1984 brood year to escapements were also important for many systems, especially in southern districts. Migratory timing of sockeye salmon through the 17 weirs in the region was highly variable, differing between stocks both in the mean date of return and standard deviation of mean date.

KEY WORDS: Sockeye salmon, catches and escapements, age, sex, size, Southeast Alaska, migratory timing, life history

INTRODUCTION

Commercial harvesting of sockeye salmon (*Oncorhynchus nerka*) began in Southeast Alaska during the 1880's. Catches, excluding Yakutat, peaked early in the history of the fishery, averaging 2.4 million sockeye salmon annually between 1910 and 1919 (Eggers and Dean 1987). Several periods of sharp declines in catches in the region were experienced over the next 60 years (see Figure 1). From 1970 through 1979 catches averaged only 642,000 fish annually. Catches have sharply increased from that level during the 1980's, averaging over 1.2 million fish.

Estimation of basic population attributes are essential to sound management. Age composition provides the basic data for stock contribution estimates, brood year returns, and exploitation rates. Size data can be used to monitor growth parameters, environmental variability, and gear selectivity. Age and size data together can be used for forecasting future returns. Migratory timing data can be used to identify interannual shifts in run timing. A comprehensive sampling program to estimate population attributes of sockeye salmon in Southeast Alaska has been operated since 1982 (McGregor 1983; McGregor et al. 1984; McGregor and McPherson 1986; McPherson and McGregor 1986; McPherson et al. 1988a, 1988b, 1988c, 1988d). The feasibility of such a program was tested in 1981 for selected fisheries and escapements and is reported in McGregor and Van Alen (1987).

The purpose of this investigation was to tabulate and summarize data on the numbers, age, sex, and size compositions of sockeye salmon in the harvest and escapement in Southeast Alaska in 1988, adding another year to the data bases begun in 1981 and 1982.

STUDY AREA AND DESCRIPTION OF FISHERIES

The study area consists of outside coastal waters of Southeast Alaska extending south from Cape Suckling to Cape Fairweather and both inside and outside waters extending south from Cape Fairweather to Dixon Entrance (shown in Figure 2). The area is divided into 16 coastal districts (101 through 116) and 7 offshore districts (152, 154, 156, 157, 181, 189, and 191). Inshore district net fisheries and escapements in the Yakutat Management Area are not presented in this report.

Sockeye salmon are taken by both U.S. and Canadian fishermen. Canadian fishermen harvest fish in the waters of two transboundary rivers (rivers originating in Canada and emptying into saltwater in the U.S.) within the study area: the Taku River which flows from Canada into District 111 and the Stikine River which flows into District 108. Stocks in these rivers are managed separately by each government under a jointly agreed to allocation for each country and an overall escapement goal. More than 100 exclusively U.S. systems (rivers or streams and associated lakes) are also known to produce sockeye salmon in Southeast Alaska.

Commercial, sport, and subsistence fisheries operate throughout the region. In 1988 U.S. commercial gill net harvests of salmon occurred in Districts 101, 102,

106, 107, 108, 111, and 115. Canadian gill net fisheries operated in the lower Canadian portions of the Taku and Stikine Rivers and in the upper Stikine River. Purse seine fisheries are operated only in U.S. waters; they harvested sockeye salmon in Districts 101 - 105, 109, 110, and 112-114 in 1988. The troll fleet operated in U.S. waters throughout the region. The Metlakatla Indian Community operated gill net, purse seine, and troll fisheries within 3,000 ft of the Annette Island shoreline in District 101 (Subdistricts 24, 26, 28, and 42), as well as a small floating fish trap fishery in Subdistrict 101-28. Sport fishing occurred throughout Southeast Alaska, primarily near population centers. Subsistence fishing was allowed at many sites in Southeast Alaska, primarily near the mouths of rivers and streams.

Of the six types of gear used to harvest sockeye salmon in Southeast Alaska, commercial purse seine and gill net fleets currently account for the vast majority of the harvest. Lesser numbers of fish are harvested commercially with troll gear and fish traps. Without exception, these fisheries harvest mixed sockeye stocks as well as other species. Subsistence and sport fisheries in Southeast Alaska, although minor compared to commercial harvests, exploit some sockeye stocks at high rates.

SOCKEYE SALMON LIFE HISTORY

An understanding of the two types of sockeye salmon life cycles is essential in interpreting some the age composition data presented. Most sockeye salmon in Southeast Alaska spawn in lakes or streams which flow into lakes. The eggs are deposited in the gravel from July through December and develop into alevins over the winter, emerging the following spring. Shortly thereafter they begin rearing in the main body of the lake and spend most of the rest of their freshwater life there. Lake rearing most often lasts 1-2 years but may extend to 4 years. After their final spring in the lake the fry gradually navigate downriver before undergoing smoltification, which is usually in May. At this time the juvenile salmon adjust to salt water in their estuarine habitat from which they migrate to marine waters. These sockeye salmon juveniles spend from 1 to 4 years in the eastern North Pacific Ocean before returning to spawn. This is the "lake-type" life cycle.

An lesser-known alternative life cycle has been observed in the Pacific Rim (Soviet Union, British Columbia, and Alaska) for a small number of sockeye salmon stocks (Bugaev 1987; Birtwell et al. 1987; Wood et al. 1987; McPherson 1988d). These sockeye salmon display a life cycle that does not spawn or rear in a lake. Spawning instead occurs in large rivers, typically in areas where groundwater upwells through deep gravel beds left behind after glaciers receded. The fry rear in areas along the river, including sloughs, pools and tributaries. These fry are unique because some of them migrate to sea after only rearing for a few months, i.e., they outmigrate at age 0. or the same year as emergence ("*zero-checks*"). Almost all of remaining fry migrate to sea at age 1. after rearing in the river habitat for 1 year ("*one-checks*"). The marine residence for river-type progeny is similar to that of lake-type.

The average life cycle for river-type fish is shorter because freshwater residence is usually a year shorter. The upwelling groundwater is warmer than inlet-stream water and emergence is probably earlier in these areas, meaning the fry hatch and begin feeding earlier than other sockeye fry. Secondly, zero-check fry rear in river delta areas much more extensively than their age-1. siblings and lake-type fry (Birtwell et al. 1987). These areas are warmer, food rich, and even somewhat saline. These two factors allow these fish to grow enough in one spring to outmigrate at age 0. Outmigration timing for zero-check fish was reported by both Birtwell et al. (1984) for the Fraser River and Murphy et al. (1989) for the Taku River to be about 1 month later than age-1. and -2. fish.

River-type sockeye salmon are important contributors to fisheries in some areas of Southeast Alaska. River-type spawning stocks have been well documented at various locations in the Stikine and Taku Rivers (McGregor and Jones 1989), as well as for the Chilkat, Lace, and Gilkey Rivers which flow into Lynn Canal (McPherson et al. 1988d; McPherson and Jones 1986). All of these rivers are glacial. The river-type stocks in the Taku and Stikine Rivers comprise over 50% of the total inriver runs in some years (PSC *in press*). The river-type stocks in Lynn Canal comprise 3-7% of the catch in District 115.

METHODS

Abundance Data

Catch

Alaskan commercial catch data presented in this report were compiled by the Division of Commercial Fisheries, Alaska Department of Fish and Game (ADF&G), and originated from individual fish tickets (sales receipts between fishermen and buyers) tabulated as of 15 March 1989. Catch data were edited for data entry and recording errors. Because embedded errors or additions are sometimes found at a later date, data file listings in the future may show minor differences from those given in this report. Catch data for Canadian commercial and subsistence fisheries on the upper Taku and Stikine Rivers were obtained from the Canadian Department of Fisheries and Oceans (PSC *in press*). Catches were assigned to a statistical week, which begins at 00:01 AM each Sunday and ends the following Saturday at midnight; statistical weeks are numbered sequentially beginning with the week encompassing the first Sunday in January. Inclusive dates for 1988 statistical weeks are shown in Appendix A.1.

Escapement

Several methods were used to estimate total escapements to Southeast Alaska systems in 1988. Weirs were operated at 13 Alaskan and 4 Canadian sites,

providing total counts of sockeye salmon to these systems. A mark-recapture tagging program was used to estimate the total Taku River escapement (McGregor and Clark 1989). Sockeye salmon were captured in fish wheels at Canyon Island (5 km from the Canadian border) and tagged. Tagged fish were recovered in the Canadian commercial and test gill net fisheries, and tagged to untagged ratios were used to derive an escapement estimate (Chapman and Junge 1956; Darroch 1961). An estimate of escapement for McDonald Lake was provided by Zadina (Alaska Department of Fish and Game, F.R.E.D. Division, personal communication). Foot survey counts were expanded to a total estimate based on correlations between stream life, foot survey data, and final weir counts in previous years. The estimated escapement to the Stikine River was made by applying migratory time densities (Mundy 1979) from inriver test fishery CPUE data to commercial catch stock composition estimates generated by scale pattern analyses (Jensen and Frank 1989). Aerial, foot, and boat surveys provided the maximum daily escapement counts for most of the other important sockeye salmon systems in the region; these counts should only be considered partial or relative indicators of escapement magnitude as they do not represent total escapements.

Age, Sex, and Size Data

Sockeye salmon were sampled for scales, sex, and length. Scales were taken from the 'preferred area' of the fish (INPFC 1963). Scales were mounted on gummed cards and impressions made in cellulose acetate (Clutter and Whitesel 1956).

Examination of scales provided age information for individual fish. Scales were magnified to 70X on a microfiche reader and ages were recorded in European notation (numerals preceding the decimal refer to the numbers of freshwater annuli, numerals following the decimal are the numbers of marine annuli, and the total age is the sum of these two numbers plus one). Ageing criteria followed from those described by Mosher (1968). Sex determination was based on examination of either gonads or external morphological features such as kipe development, belly shape, trunk depth, and jaw shape. Accuracy of sex determination was evaluated in 1987 by examining 4,923 sockeye salmon from commercial catches throughout the region and season (K. Pahlke, Alaska Department of Fish and Game, Commercial Fisheries Division, personal communication). Fish were first sexed by examining external morphological characteristics. Gonads were then examined by slitting open the belly cavity. Accuracy was 94% for the entire sample. It is believed that the accuracy of sex determination at weirs or on the spawning grounds is even higher because of further development of secondary maturation characteristics at these locations compared to commercial catches.

Fish length was measured from the middle of the eye to the fork of the tail and was recorded to the nearest 5 mm, except that post-orbit to hypural plate measurements were taken for escapements to the Little Trapper Lake, Little Tatsamenie Lake, and the Hackett River in the Taku River drainage; and to Tahltan Lake in the Stikine River drainage. Length measurements from the Taku River fish were converted to middle of the eye to fork of the tail (MEF) measurements

according to the following equation developed from lengths taken from 341 sockeye salmon caught in the Canadian commercial fishery in the Taku River in 1988:

$$MEF = 1.088\ (POH) + 19.945\ mm \qquad (1)$$

where: MEF = mid-eye to fork of tail and
POH = post-orbit to hypural plate.

Length measurements from Stikine River fish were converted to MEF measurements according to equation (2) which is one of seven length relationships developed from 820 sockeye salmon commercially caught in Southeast Alaska in 1985 (Pahlke 1988).

$$MEF = 1.103696\ (POH) + 19.50277 \qquad (2)$$

All districts in which gill net catches occurred were sampled, except Districts 102, 107, and the Annette Island portion of District 101. Purse seine catches were sampled in all districts that recorded catches, except in the Annette Island subdistricts of District 101. Fish trap, sport fish, and subsistence harvests were not sampled because of the small magnitude of the harvests and the logistic difficulties involved in obtaining samples. Escapement samples were collected either in weir traps or using dip nets, beach seining and carcass sampling. Fish wheels were used to collect Taku River escapement samples at Canyon Island. The variety of collection methods used to sample escapements may have introduced some bias into age composition estimates.

Age and sex compositions of salmon in the catches were computed for each fishery sampled. Sampling goals were to collect sufficient samples to estimate the proportion of each age class to within ± 5 percentage points 90% of the time in each stratum based on the standard binomial formulae (Cochran 1977; Appendix A.2). A general goal of 700 fish per week (of which 560 were expected to be ageable) was met each week in most of the major districts. Sampling was structured by subdistricts in Districts 106 and 113 because catches were made in widely separated geographic areas and at different times of the season.

Age and sex compositions of the salmon were also computed for each escapement area that was sampled. Most escapement locations were sampled over short periods of time, and these data were pooled into a single stratum. Some escapement areas had large enough numbers of fish (e.g., Hugh Smith Lake) to facilitate stratification by time to reflect more than one sampling period. This enabled us to analyze temporal trends in age composition.

Totals from each sample period were summed to represent the age and sex composition over the entire season for each fishery and each escapement having accurate abundance data. When only partial escapement counts were available, a percentage breakdown of each sample by age and sex was tabulated. Standard errors of the age class proportions were calculated by standard binomial formulae and

standard errors for estimates expanded to abundance data were calculated to reflect finite population size (Cochran 1977) as follows:

$$SE_{ij} = \sqrt{\left[\frac{(\hat{P}_{ij})\,(1-\hat{P}_{ij})}{n_j - 1}\right] \cdot \left[1 - \frac{n_j}{C_j}\right]}\ , \qquad (3)$$

where: i = age class,
j = stratum,
P_{ij} = proportion of fish of age i in stratum j, and
n_j = sample size for stratum j.

The standard errors for the total season commercial catch or escapement were estimated by weighting the standard error for each sampling period by the total commercial catch (or escapement) during the same sample period as follows:

$$SE_{i\cdot} = \sqrt{\frac{\sum_{1}^{j} (SE_{ij})^2 \; C_j^2}{C_\cdot^2}}\ , \qquad (4)$$

where: C_j = catch or escapement in stratum j, and
$C_\cdot$ = total-season catch or escapement.

Changes in age composition among strata were tested for significance using a test to compare two proportions described in Zar (1984).

For each fishery and escapement from which we collected fish length data, mean lengths and their standard errors were calculated for each sex and age class within sampling periods. Sampling goals from the catch were to collect sufficient numbers from each stratum in order to estimate the average length of each major (greater than 10% of the catch) age class to within ± 5 percentage points 90% of the time. A general sampling goal of 180 lengths per week was established for all districts, except in the District 111 and 115 gill net fisheries where stock-specific length composition estimates were desired and 300 lengths were taken. Weighted mean length and standard error for the entire season was calculated for each age class. A Z-test was used to identify significant changes in average length among strata. All escapement samples included length measurements to assist us in ageing.

Average weight data was obtained from the ADF&G fish ticket reporting system and was calculated by dividing the total pounds reported by the total number of fish reported.

Migratory Timing

Migratory timing (abundance as a function of time) is the driving force behind management decisions which selectively regulate time and areas open to fishing. Sockeye salmon migratory timing statistics for weired escapements and major net fisheries provided an index of relative timing.

The means and standard deviations of migratory timing, and associated migratory time density functions of sockeye salmon for weired escapements and net fisheries were derived using methodology described by Mundy (1979, 1982). The empirical migratory time density is defined as the time series of daily or weekly proportions, P_t:

$$P_t = n_t / N \ , \tag{5}$$

where: n_t = abundance during time interval t, and

N = total annual abundance.

For a migration over a space of m days, the mean of t is estimated by

$$\bar{t} = \sum_{t=1}^{m} t \, P_t \ , \tag{6}$$

and its standard deviation is estimated by

$$\hat{S}_t^2 = \sum_{t=1}^{m} (t-\bar{t})^2 \, P_t \ , \tag{7}$$

The mean time of arrival (t) for weired escapements is expressed in days (central day), while for catches it is expressed in weeks (central week, based on statistical weeks). Catch, rather than CPUE, was used as the index of abundance because catchability is variable in the net fisheries of Southeast Alaska, exploitation is often greater than 70%, and CPUE calculation is not accurate under our present reporting system. Run time estimates which are dependent on catch (or CPUE) are influenced in part by management decisions, meaning that timing estimated from catch data is not a true representation of total run (catch + escapement) run timing.

RESULTS AND DISCUSSION

Harvest Data

Numbers of Fish

A total of 1,298,083 sockeye salmon were commercially harvested in Southeast Alaska in 1988 (Table 1). Approximately 68% of the catch (887,703 fish) came from southern Southeast Alaska (Districts 101 - 108; Table 2). More than 100,000 sockeye salmon were harvested in Southeast Alaska in each of 5 consecutive weeks, between 10 July and 13 August. Catches peaked during the week of 31 July-6 August, when 311,850 fish were harvested. Over the entire season, more sockeye salmon were taken in District 104 (593,844) than in any other district. Catches of over 100,000 sockeye salmon were also taken in District 115 (351,551 fish) and in District 101 (180,063 fish, including catches made in the Annette Island Fishery Reserve).

Commercial Gill Net Catch. Gill net fisheries took 48% (627,499 fish) of the commercial sockeye salmon harvest in Southeast Alaska in 1988 (Table 1). The largest gill net catches occurred in District 115 (Lynn Canal), where the 351,551 sockeye salmon harvested (Table 3) represent the third largest catch from this district since 1959 (ADF&G 1989). The largest weekly catch in District 115 (58,744) occurred between 24-30 July.

Results of scale pattern analysis indicate that fish caught in District 115 bound for Chilkoot Lake represented approximately 73% of the total commercial catch in the district, and that catches of Chilkoot Lake sockeye salmon peaked during the week of 24-30 July. Chilkoot Lake experienced a strong run (330,000 fish) and Chilkat Lake a weak run (104,000 fish) in 1988. Chilkat Lake comprised 21% of the total catch, below the 1981-87 average of 40% for this system. Exploitation rates for Chilkoot Lake and Chilkat Lake stocks were approximately 0.75 and 0.74, respectively.

A total of 142,800 sockeye salmon were harvested in District 101. The peak weekly catch (31,865 fish) occurred early in the season, from 26 June to 2 July. Approximately 19% of the total district catch (26,555 fish) was taken in the Annette Island Fishery Reserve. The District 101 gill net fisheries target on mixed stocks from both Alaska and Canada. Scale pattern results indicate that approximately 77% of the 1988 harvest (excluding the Annette Island Fishery Reserve catches) was destined for the Nass and Skeena Rivers in northern British Columbia (Oliver and Farrington 1989). Nass/Skeena stock contributions in this district have averaged 73% for the years 1982 to 1987.

The District 106 gill net harvest was 92,532 sockeye salmon. Fish harvested in this fishery have been shown to be bound for nearby systems such as the Stikine River and numerous mainland and island lakes in Southeast Alaska, as well as to the Nass and Skeena Rivers of northern British Columbia. Based on scale pattern analysis, approximately 87% of the harvest in District 106 represented stocks bound for spawning systems in Alaska (Jensen and Frank 1989).

The District 111 drift gill net fleet harvested a total of 39,168 sockeye salmon in 1988. McGregor and Jones (1989) found, using scale pattern analysis, that 66% of the District 111 catch was comprised of Taku River stocks (31% for Mainstem Taku River, 16% for Little Trapper Lake, 12% for Kuthai Lake, and 8% for Tatsamenie Lake). Port Snettisham stocks comprised the remainder of the catch (27% Crescent Lake, 7% Speel Lake).

Small catches of sockeye salmon were recorded in District 108 (1,246 fish). District 108 was closed for much of the season to protect the poor Stikine River sockeye salmon run.

Commercial Purse Seine Catch. Purse seine fisheries accounted for the majority (51% or 657,086 fish) of the commercial sockeye salmon harvest in the region (Table 1). This is a reverse of the trend from 1984 through 1987 when gill net fisheries catches represented the greater proportion (McPherson et al. 1988d). The largest catches were made in District 104 (Table 4). A catch of 591,285 sockeye salmon was taken in this district, the second largest catch in the history of this fishery (ADF&G 1989) and 90% of the 1988 purse seine harvest in Southeast Alaska. Catches in District 104 were highest during the week of 31 July to 6 August, when 211,083 sockeye salmon were caught. Restricted fishing time enacted during the first 3 weeks of the season reduced and skewed the catch. This fishery harvests mixed stocks of sockeye salmon bound for Southeast Alaska and Canada. Scale pattern results indicate that over 82% of the District 104 catch was bound for the Nass and Skeena Rivers (Oliver and Farrington 1989). The contribution of these stocks averaged 71% for 1982-1987.

The District 101 purse seine harvest of sockeye salmon totaled 35,048 of which 2,373 were taken in the Annette Island Fishery Reserve. Catches were comprised primarily of stocks of Canadian origin (59%) and Alaskan stocks comprised the remainder (Oliver and Farrington 1989). Fish of Alaskan origin have comprised an average of 61% of the annual catch in this district since 1982.

A total of 14,798 sockeye salmon were taken in the District 102 purse seine fishery. Catches were 70% Alaskan fish (Oliver and Farrington 1989).

Less than 10,000 sockeye salmon each were incidentally harvested in purse seine fisheries targeting on pink (*Oncorhynchus gorbuscha*) and chum salmon (*Oncorhynchus keta*) in Districts 103, 105, 109, 110, 112, 113, and 114. The District 112 harvest of 3,861 sockeye salmon was a decrease of approximately 41,000 fish from the 1987 harvest.

Commercial Troll Catch. Sockeye salmon are taken incidentally by the troll fleet. A total of 9,294 fish was taken in 1981 (Table 5). Largest catches were recorded in District 114 where 3,719 (40%) of the troll harvest occurred.

Commercial Trap Catch. Four floating fish traps were used to harvest sockeye salmon in the Annette Island Fishery Reserve in District 101. A total of 2,051 sockeye salmon were harvested in 1988 (Table 6). This is the only area in the Southeast Region where fish traps are legal gear for harvesting salmon.

Canadian Transboundary River Catch. A commercial gill net fishery in the Canadian portion of the Taku River harvested 12,014 sockeye salmon (Table 7). Approximately the same number were taken in 1985, 1986, and 1987. Results of scale pattern anaylsis indicate that the catch was comprised of 42% Little Trapper Lake, 34% Mainstem Taku, 14% Kuthai Lake, and 10% Tatsamenie Lake fish (McGregor and Jones 1989). A small gill net food fishery harvested an additional 245 sockeye salmon in the Taku River in 1988.

Commercial gill net fisheries in the Canadian portion of the Stikine River exploit most of the Canadian Stikine sockeye stocks. In 1988, 12,766 sockeye salmon were harvested from the lower river commercial fishery (Table 7). Tahltan Lake fish comprised 16% of the catch while other stocks comprised the remainder (Jensen and Frank 1989). On the upper Stikine River a subsistence fishery harvested 2,177 sockeye salmon and a commercial fishery harvested 348 fish.

Sport Catch. The sport catch of sockeye salmon in Southeast Alaska was estimated to be 6,984 fish (Mills 1989; Table 8).

Subsistence Catch. The sum of reported subsistence harvest of sockeye salmon in Southeast Alaska was 20,097 from all areas (Table 9). The true subsistence harvest was certainly higher since many permits were not returned to ADF&G.

Age, Sex, and Size Data

Gill Net Catch. Detailed age and length compositions (with standard errors) of sockeye salmon in the catches plus tests for temporal changes for each district or subdistrict sampled are presented in Appendices B.1 through B.30 in McPherson et al. (1990). Four- and 5-year-old sockeye salmon (1984 and 1983 brood years) were the dominant year classes taken in the gill net fisheries, comprising 17% and 69% of the total catch (Table 10). Age-1.3 fish dominated in catches from all

but one district (101), ranging from 28% in District 101 to a maximum of 68% in District 115. Even though predominant, the percentages of age-1.3 fish in all districts except 115 were among the lowest observed since age composition estimation began in 1981. Age-2.2 fish were the most abundant age class in District 101. Zero-check sockeye salmon (ages 0.2, 0.3, and 0.4) were common in the District 108 and 111 catches and were most abundant in Lynn Canal (District 115), where they represented 2% of the total catch. Sockeye salmon that spent two winters in fresh water prior to migrating to sea (ages 2.1, 2.2, 2.3, and 2.4) were more common in the District 101, 115, and 106 catches (43%, 24%, and 21%, respectively) than in other districts. Six-year-old fish (primarily age 2.3) represented between 7% and 18% of the catches in all districts.

Significant changes ($P<0.01$) in age composition during the season were apparent in all seven gill net areas for which data could be stratified by sample period. Age-1.3 fish represented smaller proportions of the catches as the season progressed except in District 111. Age-1.2 fish became more common later in the season in all southern districts and decreased in the northern districts (111 and 115). Age 0.3 fish decreased in Districts 101 and 115 and increased in District 111 catches throughout the season. District 115 exhibited the greatest changes in temporal age composition among gill net fisheries (Figure 3). Ages 0.3 and 1.3 decreased later in the season and were replaced by ages 2.2 and 2.3; age-1.2 fish were most abundant mid-season.

Differences in the average lengths of sockeye salmon existed between gill net fisheries (Table 11). District 115 fish were the longest: overall (583 mm), males (589 mm) and females (578 mm). The fish caught in the Canadian Taku fishery were the shortest: overall (558 mm), males (555 mm) and females (561 mm). In general, females exhibited less variation in average length than males and were smaller. Fish with three marine annuli were larger than fish with two marine annuli. In general, the Canadian Taku River were the smallest and District 101 the largest fish within age classes.

Few trends in the temporal length distributions were apparent within the gill net fisheries in 1988 (see McPherson et al. 1990). Exceptions to this were significant ($P<0.01$) increases in age-2.2 fish in District 101, age-1.2 fish in Subdistrict 106-30, and age-1.3, -2.2, and -2.3 fish in District 115. Also, average lengths of age-1.2 fish decreased through the season in the Canadian Taku fishery.

The average weight of sockeye salmon increased (non statistical comparison = NSC) near the end of the season in most gill net fisheries (Table 12). Many fishermen use a larger mesh size at this time of the yeaa to catch coho and chum salmon, thereby selecting for larger size sockeye salmon. Among districts with catches over 20,000 fish, the average weight per fish over the entire season was smallest in District 101 (2.79 kg) and largest in District 115 (3.19 kg). From the southernmost to the northernmost districts, average weight increased (NSC).

Purse Seine Catch. Detailed age and length compositions (with standard errors) of the purse seine catches and tests for temporal changes in each district or subdistrict sampled are presented in Appendices C.1 through C.33 in McPherson et al. (1990). Younger-aged sockeye salmon were taken in the purse seine fisheries

than in the gill net fisheries. Age-1.2 fish were the most common age class, comprising 66% of the season's purse seine catch (Table 13); the percentage of age-1.2 fish in all major districts was the highest recorded since age composition estimates were begun in 1982. In District 113 catches were dominated by age-2. and -3. fish, taken mostly in Subdistrict 113-10 (Whale Bay).

Distinct shifts in age composition with time were apparent in all five of the purse seine districts stratified by sample period ($P<0.01$ for all reported changes; McPherson et al. 1990). Age-1.2 fish represented a greater proportion of the catches later in the season in all southern districts; age-1.3 fish represented a lessor proportion. In District 109 age-1.2 fish decreased and age-2.2 fish increased in relative abundance over the duration of the season. In District 112 ages 0.3 and 1.3 exhibited a temporal decrease and age 2.2 a temporal increase as the season progressed.

Few differences in average lengths of sockeye salmon were apparent among the purse seine fisheries with appreciable catches: Districts 101, 102, and 104 (Table 14). The average length of males was generally greater than those of females within specific age classes, but the difference was less than that observed for the gill net data. As was observed in the gill net fisheries, length increased with ocean age.

Few obvious temporal changes in average lengths of sockeye salmon within specific age classes were observed. Seasonal increases in average length in District 104 for ages 1.2 and 1.3 and in District 109 for ages 1.2, 1.3, and 2.2 were exceptions.

The average weight of sockeye salmon exhibited no obvious trend throughout the season in the purse seine fisheries in 1987 (Table 15). Among the major districts (101, 102, and 104), fish in District 101 were largest (2.56 kg) and smallest (2.42 kg) in District 104, on average (NSC).

Test Fisheries Catches. Detailed age and length compositions of the gill net test fishery catches for each district sampled are presented in Appendices D.1 through D.10 in McPherson et al. (1990). Drift gill net and set gill net test fisheries in the Canadian portion of the Stikine River operated throughout the season and were used to estimate stock contributions to the 1988 run (Jensen and Frank 1989).

Migratory Timing

Gill Net Fishery. Run timing analysis of the catches in the gill net fisheries provided mean dates, in statistical weeks (MSW), of migration. These ranged between 28 and 32 (3 July to 6 August) for all districts (Table 16). The run in District 101 was the earliest (MSW = 28.7, 11 July) and that in District 115 the latest (MSW = 31.6, 31 July; NSC). The catch in District 115 was the most dispersed (SD = 2.6 weeks), while in the Canadian Stikine River fishery it was the least dispersed (SD = 1.6 weeks). Run timing among individual age classes

within Districts 101, 106, and 108 indicated that age-0.3 fish arrived earliest and little difference was evident among other age classes. In the District 111 fishery age-1. fish were earliest, followed by age-0. and -2. fish. In the Canadian Taku River fishery the MSW for age-0.3 fish was approximately 2 weeks later than those for age-1. and -2. fish. Lynn Canal (District 115) exhibited the greatest differences in run timing among age classes; age-0.3 fish were earlier by 2 weeks than age-1. and 1 month earlier than age-2. fish.

Purse Seine Fishery. Catches in the purse seine fisheries for which adequate sampling stratification existed show that overall run timing varied little across fisheries, (Table 17). Timing was earliest (NSC) in the southern half of District 104 (MSW=30.6, 24 July) and latest in northern half (MSW = 31.3, 29 July). Among individual age classes fish aged 0.3 arrived earliest in Districts 101 and 104. In District 109 age-1.2 fish arrived earliest and age-2.2 the latest. In District 112 age-0.3 and -1.3 fish were 1 week earlier than age-1.2, 2 weeks earlier than age-2.2 fish, and almost 3 weeks earlier than age-2.3 fish.

Cumulative migratory time densities and associated statistics are presented for individual purse seine and gill net fisheries in Appendices C.1-C.12.

Escapement Data

Detailed age compositions, length compositions, and daily weir counts, and standard errors are presented in Appendices E.1 through E.144 in McPherson et al. (1990). Also presented in those appendices are results of testing for significant changes in age or length composition.

Abundance Estimates

The largest sockeye escapement in Southeast Alaska was 81,274, observed at the Chilkoot Lake weir (Table 18). Large spawning escapements to the Taku River (74,055 fish) and McDonald Lake (70,335 fish) were estimated. These estimates are comparable to those for the previous 4 years for Chilkoot Lake and the Taku River, while the estimate for McDonald Lake was only half the average. Only 27,593 sockeye salmon were counted past the Chilkat Lake weir; this was approximately 41,000 below the average for 1976 to 1987. A total of 22,210 sockeye salmon moved through the Salmon Bay Lake weir. The escapement estimate for the Stikine River was only 17,747 fish which represents the lowest estimate for this system since before 1981. Two types of escapement estimates are presented in Table 18: total escapement estimates and relative or partial escapement estimates. Foot and aerial counts represent only the fish visible during 1-day surveys and should not be construed to be accurate indicators of escapement magnitude.

Age, Sex, and Size Composition

Five-year-old fish, primarily age 1.3, dominated (62%) in 31 of the 50 escapement collections (Table 19). This was a lower percentage than in 1987 when 5-year-old fish were the most abundant year class in 76% of the escapement collections (McPherson 1988d). In the remaining 19 systems, 4-year-old fish (primarily age 1.2) dominated 16 systems; age-0.3 fish were the principal age class in 2 locations along the Taku Mainstem and from the Chilkat River Mainstem. Six-year-old fish were the most abundant year class in the Auke Lake and Chilkat Lake escapements.

Age-1. fish were the most abundant freshwater age class in 76% of the escapement collections (Table 19), approximately the same percent as in 1987. Age-2. fish dominated in 16% of the escapement systems, all of which are lake systems. Fish aged 0. were common in collections from along the mainstems of the three largest river systems in the region, the Chilkat, Taku, and Stikine, and were the prevailing freshwater age class in four river-type stocks.

Age-.3 fish were the most prevalent (54%) ocean age in 27 of the 50 escapement collections, compared to 78% in 1987 and 64% in 1986 (McPherson 1988d). However, age-.2 fish were much more common in southern Southeast (Districts 101 - 108) where they were the most common ocean age in 60% of the escapement collections from these districts. In northern districts (109 - 115) age-.2 fish were most abundant in 32% of the systems, compared to 7% in 1987 and 24% in 1986. In general, younger aged fish comprised a greater percentage of the escapements than in past years.

Samples from 13 escapement systems were large enough to allow temporal trends in the age compositions to be observed. Within individual escapements the changes in relative abundance over time for $P<0.01$ were (1) an increase in age-1.2 fish in 7 systems (Hugh Smith, Karta, Tahltan, Taku River, Little Trapper, Little Tatsamenie, and Chilkoot); (2) a decrease in age-1.3 fish in eight systems (Hugh Smith, Karta, Tahltan, Taku River, Little Trapper, Little Tatsamenie, Redoubt, and Chilkat); (3) an increase in age-2.2 fish in six systems (Hugh Smith, Karta, Taku River, Little Tatsamenie, Redoubt, and Chilkat); (4) a decrease in age-2.3 fish in three systems (Hugh Smith, Naha, and Taku River); and (5) an increase in age-2.3 fish in Little Trapper and Chilkat Lakes. Obviously, some of these changes are correlated and the most common trend overall was for age-.2 fish to increase and age-.3 fish to decrease in relative abundance as the season continued.

Differences in average lengths were observed among escapement systems (Table 20). Overall (across ages) average length tended to be larger in northern districts, principally because of the presence of a greater proportion of younger ocean-age fish in the escapements in southern districts. However, within individual age classes, fish in the southern districts tended to be larger than in northern districts. Fish aged 0.3 were larger in the Taku River drainage than those from the Stikine River or Lynn Canal. Fish aged 1.2 tended to be larger in Districts 101 and 102, and smaller in Districts 106 and 111. Age-1.3 fish tended to be larger in Districts 101 and 108 than in other districts. Among age-2.3 fish,

average lengths tended to be larger in Districts 101 and 102, and smaller in District 106. Among individual systems, Chilkat Lake exhibited the largest average length for ages 1.3 (611 mm), 2.2 (565 mm), and 2.3 (625 mm) and the largest overall average length (616 mm).

Few trends through time were observed for average length in the 13 escapement systems in which sample sizes were large enough to permit stratification. Significant changes ($P<0.01$) did occur in some ages, however. These included (1) age-1.2 fish increased in size in three systems (Salmon Bay, Speel, and Chilkoot) and decreased in two others (Karta and Taku River); (2) age 1.3 average length increased in two systems (Chilkat and Chilkoot) and decreased in three others (Karta, Tahltan, and Little Tatsamenie); (3) fish aged 2.2 increased in average length in four locations (Hugh Smith, Redoubt, Chilkat, and Chilkoot); and (4) fish aged 2.3 decreased at Karta.

Migratory Timing

Weirs were operated at a total of 17 locations to count sockeye salmon in Southeast Alaska and tributaries of the Taku and Stikine Rivers in western British Columbia. Dates of operation, final escapement counts, and run timing characteristics of these escapements are summarized in Table 21. The mean dates of return to Karta River and Naha River, 15 July and 19 July, respectively, were the earliest of all the systems, while the mean date of the Klawock Lake return (9 September) was the latest. The Little Trapper Lake and Klawock Lake returns were the most concentrated (SD=7 days), while the Chilkat Lake return was the most evenly distributed over the longest period of time (SD=29 days).

Historical Age Compositions

Historical (1981-88) age compositions for gill net and purse seine fisheries and selected escapements are presented in Appendices B.1 through B.3. These data are presented principally for future use in construction of brood year tables, setting of escapement goals, and forecasting. Results found in this report were combined with those in previous findings (McGregor 1983; McGregor et al. 1984; McGregor and McPherson 1986; McPherson and McGregor 1986; McGregor and Van Alen 1987; McPherson et al. 1988a, 1988b, 1988c, 1988d, 1990). General trends in age structure and year class strength can be seen in this data.

All gill net fisheries were dominated by 5-year-old (mostly age 1.3) fish in all years where sufficient samples were taken to precisely describe age structure (Appendix B.1). Age compositions in District 101 have consistently exhibited a high proportion of age-2.2 fish. The age compositions in Districts 106, 108, and 111 have been dominated by age-1.3 fish. Fish in District 115 have been older than fish in other gill net fisheries and age compositions consistently shown a high proportion of age-2.3 fish.

All purse seine fisheries have been dominated by 5-year-old (mostly age 1.3) sockeye salmon in all years, except in 1988 when 4-year-old (age-1.2) fish were the dominant age class. Age-1.2 fish have been more prevalent in the purse seine fisheries than in gill net fisheries in all years. Consequently, the average age of sockeye salmon harvested in the purse fisheries is younger. Age-2.2 fish have been the dominant age class in all years in Subdistrict 113-34 and age-0.3 fish have been consistently prevalent in District 112.

Historical age compositions from selected escapements in Southeast Alaska are shown in Appendix B.3. Age-1.3 fish dominated most escapements in most years. The most notable exceptions to this occurred in Hugh Smith Lake where age-1.2 fish dominated in 3 years, in Sarkar Lake where age-1.2 and -2.2 fish have usually been the most abundant, and in Chilkat Lake where age-2. fish were predominant in 7 of 8 years. Age-0. fish have been consistently present in the Taku River (Canyon Island) scale samples. Interannual shifts in age structure in many individual escapements can be attributed to year-class strengths in combination with environmental factors.

LITERATURE CITED

ADF&G (Alaska Department of Fish and Game) 1989. Report to the Board of Fisheries - 1988 Southeast Alaska and Yakutat (Region I) finfish fisheries. Division of Commercial Fisheries, Regional Information Report 1J89-02, Juneau.

Birtwell, I.K., M.D. Nassichuk, and H. Beune. 1987. Underyearling sockeye salmon in the estuary of the Fraser River. Pages 25-35 *in* H.D. Smith, L. Margolis, and C.C. Wood, editors. Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Canadian Special Publication of Fisheries and Aquatic Sciences 96.

Bugaev, V.F. 1987. Scale patterns and biology of juvenile sockeye salmon (*Oncorhynchus nerka*) in the Kamchatka River. Pages 36-43 *in* H.D. Smith, L. Margolis, and C.C. Wood, editors. Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Canadian Special Publication of Fisheries and Aquatic Sciences 96.

Chapman, D.G., and C.O. Junge. 1956. The estimation of the size of a stratified animal population. Annals of Mathematical Statistics 27:375 - 389.

Clutter, R., and L. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. Bulletin International Pacific Salmon Fisheries Commission 9, New Westminster, British Columbia, Canada.

Cochran, W. 1977. Sampling techniques, 3rd edition. John Wiley & Sons, Inc. New York.

Darroch, J.N. 1961. The two-sample capture-recapture census when tagging and sampling are stratified. Biometrika 48:241-260.

Eggers, D., and M.R. Dean. 1987. Alaska commercial salmon catches, 1978-1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J87-01, Juneau.

INPFC (International North Pacific Fisheries Commission). 1963. Annual report - 1961. Vancouver, British Columbia, Canada.

Jensen, K.A., and I.S. Frank. 1989. Stock compositions of sockeye salmon catches in Southeast Alaska's Districts 106 & 108 and in the Stikine River, 1988 estimated with scale pattern analysis. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-44, Juneau.

McGregor, A.J. 1983. Age, sex, and size of sockeye salmon (*Oncorhynchus nerka* Walbaum) catches and escapements in Southeastern Alaska in 1982. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 100, Juneau.

LITERATURE CITED (Continued)

McGregor A.J., S.A. McPherson, J.E.Clark. 1984. Abundance, age, sex, and size of sockeye salmon (*Oncorhynchus nerka* Walbaum) catches and escapements in Southeast Alaska in 1983. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 132, Juneau.

McGregor, A.J., and S.A. McPherson. 1986. Abundance, age, sex, and size of sockeye salmon (*Oncorhynchus nerka* Walbaum) catches and escapements in Southeastern Alaska in 1984. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 166, Juneau.

McGregor, A.J., and B.W. Van Alen. 1987. Abundance, age, and sex compositions of chinook, sockeye, coho, and chum salmon catches and escapements in Southeast Alaska in 1981. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 200, Juneau.

McGregor, A.J., and E.L. Jones. 1989. Taku River and Port Snettisham sockeye salmon stock proportions in 1988 Southeast Alaska and Canadian fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-43, Juneau.

McGregor, A.J., and J.E. Clark. 1989. Migratory timing and escapement of Taku River salmon stocks in 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-40, Juneau.

McPherson, S.A., and A.J. McGregor. 1986. Abundance, age, sex, and size of sockeye salmon (*Oncorhynchus nerka* Walbaum) catches and escapements in Southeastern Alaska in 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 166, Juneau.

McPherson, S.A., and E.L. Jones. 1986. Contribution, exploitation, and migratory timing of returns of sockeye salmon to Lynn Canal in 1986 based on analysis of scale patterns. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 220, Juneau.

McPherson, S.A., A.J. McGregor, and F.E. Bergander. 1988a. Data: Abundance, age, sex, and size of sockeye salmon catches and escapements in Southeast Alaska in 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J88-2, Juneau.

McPherson, S.A., A.J. McGregor, and F.E. Bergander. 1988b. Abundance, age, sex, and size of sockeye salmon catches and escapements in Southeast Alaska in 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 88-08, Juneau.

McPherson, S.A., A.J. McGregor, and M.A. Olsen. 1988c. Data: Abundance, age, sex, and size of sockeye salmon catches and escapements in Southeast Alaska in 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J88-23, Juneau.

LITERATURE CITED (Continued)

McPherson, S.A., A.J. McGregor, and M.A. Olsen. 1988d. Abundance, age, sex, and size of sockeye salmon catches and escapements in Southeast Alaska in 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 88-12, Juneau.

McPherson, S.A., M.A. Olsen, and M.L. Rowse. 1990. Data: Abundance, age, sex, and size of sockeye salmon catches and escapements in Southeast Alaska in 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J90-32, Juneau.

Mills, M.J. 1989. Alaska statewide sport fisheries harvest report. Alaska Department of Fish and Game, Division of Sport Fisheries, Fisheries Data Series 122, Juneau.

Mosher, K. 1968. Photographic atlas of sockeye salmon scales. U.S. Fish and Wildlife Service, Fishery Bulletin 67:243-280.

Murphy, M.L., K.V. Koski, J.M. Lorenz, and J.F. Thedinga. 1989. Migrations of juvenile salmon in the Taku River, Southeast Alaska. National Marine Fisheries Service, Auke Bay Laboratory Report, Juneau.

Mundy, P.R. 1979. A quantitative measure of migratory timing illustrated by application to the management of commercial salmon fisheries. Ph.D. dissertation, University of Washington, Seattle.

Mundy, P.R. 1982. Computation of migratory timing statistics for adult chinook salmon in the Yukon River, Alaska, and their relevance to fisheries management. North American Journal of Fisheries Management 2:359-370.

Oliver, G.T., and C.W. Farrington. 1989. Contribution of Alaskan, Canadian, and transboundary sockeye stocks to catches in Southeast Alaska purse seine and gill net fisheries, Districts 101-108, 1988, based on analysis of scale patterns. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-45, Juneau.

Pahlke K. 1988. Length conversion equations for sockeye, chinook, and coho salmon in Southeast Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J88-03, Juneau.

PSC (The Pacific Salmon Commission). *In press.* Transboundary river salmon production, harvest, and escapement estimates, 1988. Transboundary Technical Committee Report, Vancouver, British Columbia, Canada.

Wood, C.D., B.E. Riddell, and D.T. Rutherford. 1987. Alternative juvenile life histories of sockeye salmon (*Oncorhynchus nerka*) and their contribution to production in the Stikine River. Pages 12-24 *in* H.D. Smith, L. Margolis, and C.C. Wood, editors. Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Canadian Special Publication of Fisheries and Aquatic Sciences 96.

Zar, J.H. 1984. Biostatistical analysis, 2nd edition. Prentice-Hall, Inc. New Jersey.

Table 1. Harvest of sockeye salmon in Southeast Alaska, 1988.

Fishery	Number Harvested	Percent
Alaskan Commercial		
Gill net	627,499	46.3
Purse Seine	657,086	48.5
Trap	2,051	0.2
Troll	9,294	0.7
Miscellaneous [a]	2,153	0.2
Subtotal	1,298,083	95.8
Canadian Transboundary		
Taku Commercial	12,014	0.9
Stikine Commercial	13,114	1.0
Stikine Subsistence	2,177	0.2
Subtotal	27,305	2.0
Canadian Transboundary		
Taku Test Fish [b]	708	0.1
Stikine Test Fish [b]	1,246	0.1
Subtotal	1,954	0.1
Sport	7,711	0.6
Alaskan Subsistence	20,097	1.5
Total	1,355,150	100.0

[a] Includes test fish catches, confiscated fish, hatchery harvests, etc.

[b] Does not apply to U.S./Canada treaty allocation.

Table 2. Total commercial harvest of sockeye salmon in Southeast Alaska by district and statistical week, 1988. Catches by miscellaneous gear types in addition to trap, gill net, purse seine and troll are included.

Inclusive Dates	Stat. Week	Districts								Southern Southeast Total
		101 [a]	102	103	104	105	106	107	108	
June 12-June 18	25	1	0	0	0	0	39	1	11	52
June 19-June 25	26	16,009	1	0	0	0	2,375	0	181	18,566
June 26-July 02	27	31,866	1	0	33	2	8,703	0	455	41,060
July 03-July 09	28	27,951	7	25	16,466	9	8,993	2	560	54,013
July 10-July 16	29	25,922	2,033	17	131,404	11	24,999	0	492	184,878
July 17-July 23	30	15,919	608	26	102,708	16	18,457	4	173	137,911
July 24-July 30	31	15,930	4	18	30,461	260	12,197	1	27	58,898
July 31-Aug. 06	32	31,335	5,943	2	211,170	2	12,421	17	0	260,890
Aug. 07-Aug. 13	33	11,308	3,656	17	68,280	60	2,581	15	0	85,917
Aug. 14-Aug. 20	34	2,613	695	413	14,795	26	2,365	1	0	20,908
Aug. 21-Aug. 27	35	842	1,439	1,474	15,074	2	565	1	0	19,397
Aug. 28-Sept. 03	36	251	226	484	3,453	11	129	0	0	4,554
Sept. 04-Sept. 10	37	71	370	26	0	0	2	0	0	469
Sept. 11-Sept. 17	38	34	87	6	0	0	0	0	0	127
Sept. 18-Sept. 24	39	11	47	0	0	0	0	0	0	58
Sept. 25-Oct. 01	40	0	4	0	0	0	0	0	0	4
Oct. 02-Oct. 08	41	0	1	0	0	0	0	0	0	1
Total		180,063	15,122	2,508	593,844	399	93,826	42	1,899	887,703

Inclusive Dates	Stat. Week	Districts								Northern Southeast Total	Southeast Total
		109	110	111	112	113	114	115	Outside Troll [b]		
June 12-June 18	25	0	0	0	0	0	121	0	0	121	173
June 19-June 25	26	2	0	2,749	0	0	85	7,938	0	10,774	29,340
June 26-July 02	27	7	1	4,861	1	36	313	16,054	1	21,274	62,334
July 03-July 09	28	39	1	3,948	886	140	354	24,471	18	29,857	83,870
July 10-July 16	29	429	37	6,103	1,150	447	590	37,859	112	46,727	231,605
July 17-July 23	30	4,248	1	9,349	320	271	1,076	27,183	142	42,590	180,501
July 24-July 30	31	689	0	4,258	149	190	349	58,744	148	64,527	123,425
July 31-Aug. 06	32	393	6	2,810	2	8	82	47,603	56	50,960	311,850
Aug. 07-Aug. 13	33	1,200	0	2,088	402	968	445	57,712	156	62,971	148,888
Aug. 14-Aug. 20	34	271	2	2,071	933	64	110	21,053	157	24,661	45,569
Aug. 21-Aug. 27	35	165	0	390	73	9	1,197	28,562	18	30,414	49,811
Aug. 28-Sept. 03	36	91	0	434	52	23	103	15,710	84	16,497	21,051
Sept. 04-Sept. 10	37	1	0	147	2	0	63	5,472	32	5,717	6,186
Sept. 11-Sept. 17	38	0	0	11	4	0	70	1,709	8	1,802	1,929
Sept. 18-Sept. 24	39	0	0	0	2	0	5	1,140	0	1,147	1,205
Sept. 25-Oct. 01	40	0	0	0	0	0	0	245	0	245	249
Oct. 02-Oct. 08	41	0	0	0	0	0	0	96	0	96	97
Total		7,535	48	39,219	3,976	2,156	4,963	351,551	932	410,380	1,298,083

[a] Includes catches made on the Annette Island Fishery Reserve in District 101.
[b] Includes catches made in Districts 116, 150, 152, 154, 156, 157, 181, 183, 186, 189, and 191.

Table 3. Total gill net harvest of sockeye salmon in Southeast Alaska by district and statistical week, 1988.

Inclusive Dates	Stat. Week	Districts [a] 101 [b]	101 [c]	102	106 [d]	107 [e]	108	111	115	Total
June 12-June 18	25	-	-	-	0	1	0	-	-	1
June 19-June 25	26	12,187	3,822	-	2,254	-	151	2,749	7,938	29,101
June 26-July 02	27	31,542	323	-	8,516	-	397	4,861	16,054	61,693
July 03-July 09	28	23,364	3,582	-	8,788	-	313	3,943	24,471	64,461
July 10-July 16	29	15,183	5,276	-	24,718	-	385	6,097	37,859	89,518
July 17-July 23	30	9,014	3,867	-	18,215	4	0	9,322	27,183	67,605
July 24-July 30	31	5,123	3,629	-	12,042	1	0	4,256	58,744	83,795
July 31-Aug. 06	32	13,988	3,205	-	12,408	17	-	2,806	47,603	80,027
Aug. 07-Aug. 13	33	4,806	1,333	96	2,570	9	-	2,085	57,712	68,611
Aug. 14-Aug. 20	34	803	807	19	2,365	-	-	2,067	21,053	27,114
Aug. 21-Aug. 27	35	7	609	55	551	-	-	390	28,562	30,174
Aug. 28-Sept. 03	36	145	82	0	105	-	-	434	15,710	16,476
Sept. 04-Sept. 10	37	55	12	-	0	-	-	147	5,472	5,686
Sept. 11-Sept. 17	38	18	7	-	0	-	-	11	1,709	1,745
Sept. 18-Sept. 24	39	10	1	-	0	-	-	0	1,140	1,151
Sept. 25-Oct. 01	40	-	-	-	-	-	-	-	245	245
Oct. 02-Oct. 08	41	-	-	-	-	-	-	-	96	96
Total		116,245	26,555	170	92,532	32	1,246	39,168	351,551	627,499

[a] Dash (-) indicates fishery not open in that statistical week.
[b] Totals include 111 fish from Nakat Bay (101-10) and 19 fish from Neets Bay (101-95) special harvest areas.
[c] Gill net catch on the Annette Island Fishery Reserve in District 101, Subdistricts 24, 26, 28, and 42. Catch figures are in addition to other 101 gill net totals in first column.
[d] Totals include 3 fish from Crystal Lake (106-44) special harvest area in statistical weeks 26 and 36.
[e] Earl West Cove (107-45) special harvest area.

Table 4. Total purse seine harvest of sockeye salmon in Southeast Alaska by district and statistical week, 1988.

Inclusive Dates	Stat. Week	Districts [a] 101 [b]	101 [c]	102	103 [d]	104	105	109	110	112 [e]	113	114	Total
July 03-July 09	28	965	19	-	-	16,280	-	-	-	876	0	15	18,155
July 10-July 16	29	5,142	0	2,025	-	130,926	-	378	33	1,141	233	39	139,917
July 17-July 23	30	2,847	0	592	-	101,583	-	4,064	-	267	-	27	109,380
July 24-July 30	31	5,729	154	0	-	30,244	248	620	-	132	5	52	37,184
July 31-Aug. 06	32	12,478	1,397	5,941	-	211,083	-	344	-	-	-	-	231,243
Aug. 07-Aug. 13	33	4,807	347	3,556	-	68,003	-	1,138	-	398	887	-	79,136
Aug. 14-Aug. 20	34	690	217	673	395	14,662	-	256	-	929	3	-	17,825
Aug. 21-Aug. 27	35	12	214	1,376	1,474	15,060	-	164	-	69	2	1,095	19,466
Aug. 28-Sept. 03	36	-	17	176	482	3,444	7	84	-	49	0	-	4,259
Sept. 04-Sept. 10	37	4	-	320	26	-	-	1	-	-	0	-	351
Sept. 11-Sept. 17	38	1	8	87	6	-	-	-	-	-	-	16	118
Sept. 18-Sept. 24	39	-	-	47	-	-	-	0	-	-	-	-	47
Sept. 25-Oct. 01	40	-	-	4	-	-	-	-	-	-	-	-	4
Oct. 02-Oct. 08	41	-	-	1	-	-	-	-	-	-	-	-	1
Total		32,675	2,373	14,798	2,383	591,285	255	7,049	33	3,861	1,130	1,244	657,086

[a] Dash (-) indicates fishery not open in that statistical week.

[b] Totals include 1,475 fish from Nakat Bay (101-10) and 84 fish from Neets Bay (101-95) special harvest areas.

[c] Purse seine catch on the Annette Island Fishery Reserve in District 101, Subdistricts 24, 26, 28, and 42. Catch figures are in addition to other 101 purse seine totals in first column.

[d] Totals include 57 fish from Klawock (103-60) special harvest area in statistical weeks 35 and 36.

[e] Totals include 1,567 fish from Hidden Falls (112-22) special harvest area in statistical weeks 28, 29, 30, 33, 34 and 35.

Table 5. Total troll harvest of sockeye salmon in Southeast Alaska, by district and statistical week, 1988.

Inclusive Dates	Stat. Week	Districts													Outside Troll [a]	Total
		101	102	103	104	105	106	107	109	110	111	112	113	114		
June 12-June 18	25	1	0	0	0	0	0	0	0	0	0	0	0	121	0	122
June 19-June 25	26	0	1	0	0	0	0	0	2	0	0	0	0	85	0	88
June 26-July 02	27	0	1	0	33	2	13	0	7	1	0	1	36	313	1	408
July 03-July 09	28	21	7	25	186	9	12	2	39	1	0	5	140	339	18	804
July 10-July 16	29	4	8	17	478	11	20	0	51	4	2	7	214	551	112	1,479
July 17-July 23	30	54	16	26	1,125	16	23	0	184	1	8	1	271	1,049	142	2,916
July 24-July 30	31	13	4	18	217	12	0	0	69	0	2	17	185	297	148	982
July 31-Aug. 06	32	3	2	2	87	2	13	0	21	0	0	2	8	82	56	278
Aug. 07-Aug. 13	33	15	4	17	277	60	11	6	62	0	0	4	81	445	156	1,138
Aug. 14-Aug. 20	34	13	3	6	64	26	0	1	14	0	0	4	60	110	157	458
Aug. 21-Aug. 27	35	0	8	0	14	2	3	1	1	0	0	3	6	102	18	158
Aug. 28-Sept. 03	36	7	50	2	9	4	1	0	7	0	0	3	23	103	84	293
Sept. 04-Sept. 10	37	0	0	0	0	0	0	0	0	0	0	2	0	63	32	97
Sept. 11-Sept. 17	38	0	0	0	0	0	0	0	0	0	0	4	0	54	8	66
Sept. 18-Sept. 24	39	0	0	0	0	0	0	0	0	0	0	2	0	5	0	7
Total		131	104	113	2,490	144	96	10	457	7	12	55	1,024	3,719	932	9,294

[a] Includes catches made in Districts 116, 150, 152, 154, 156, 157, 181, 183, 186, 189, and 191.

Table 6. Total trap harvest of sockeye salmon in Southeast Alaska by statistical week, 1988.

Inclusive Dates	Statistical Week	Subdistrict 101-28
July 10 - July 16	29	317
July 17 - July 23	30	132
July 24 - July 30	31	1,262
July 31 - Aug. 06	32	263
Aug. 14 - Aug. 20	34	77
Total		2,051

Table 7. Canadian harvest of sockeye salmon from transboundary rivers by statistical week and location, 1988.

		Taku River			Stikine River				
Inclusive Dates	Stat Week	Commercial Catch	Days Fished	Number of Boats	Upper River Commercial Catch	Days Fished	Lower River Commercial Catch	Days Fished	Subsistence Catch
June 19 - June 25	26								0
June 26 - July 02	27	1,758	2	10	1	1	392	1	38
July 03 - July 09	28	721	1	12	29	1	568	1	373
July 10 - July 16	29	2,645	2	14	100	0.5	519	0.5	249
July 17 - July 23	30	2,164	2	14	70	1	2,156	2	634
July 24 - July 30	31	1,749	2	13	89	1	2,723	4	580
July 31 - Aug. 06	32	859	1	13	45	1	4,016	4	283
Aug. 07 - Aug. 13	33	864	1	13	14	1	1,663	4	17
Aug. 14 - Aug. 20	34	803	1	12			462	2	3
Aug. 21 - Aug. 27	35	314	1	13			242	2	
Aug. 28 - Sept. 03	36	137	1.7	12			7	2	
Sept. 04 - Sept. 10	37						18	2	
Sept. 11 - Sept. 17	38						0	2	
Total		12,014	14.7	126	348	6.5	12,766	26.5	2,177

Table 8. Total estimated sport fish harvest of sockeye salmon in Southeast Alaska by area, 1988 (from M.J. Mills, 1989).

Area	Catch
Ketchikan	327
Prince of Wales Island	1,729
Kake-Petersburg-Wrangell	163
Sitka	3,147
Juneau	436
Haines-Skagway	672
Glacies Bay	510
Total	6,984

Table 9. Total reported subsistence harvest of sockeye salmon in Southeast Alaska, 1988.

Location Code	System	Numbers Reported [a]
101-30-075	Hugh Smith Lake	22
101-45-032	Leask Cove	183
101-55-083	Red Creek	2
101-80-063	Yes Bay	2,334
101-80-068	Wolverine Cr. (McDonald Lk.)	10
District 101 Total		2,551
102-30-067	Kegan Lake	75
102-50-038	Dog Salmon	59
102-60-087	Karta River	790
102-70-058	Thorne River	32
District 102 Total		956
103-15-027	Klakas Lake	53
103-25-009	Eek	49
103-25-020	Hetta Inlet	507
103-40-060	Kasook	13
103-60-047	Klawock River	1751
103-60-047	Klawock	110
103-60-087	Karta	40
103-80-031	Warm Chuck	10
103-90-014	Sarkar	1593
District 103 Total		4,126
105-43-002	Shipley Bay	232
District 105 Total		232
106-30-051	Hatchery Creek (Sweetwater)	923
106-41-010	Salmon Bay	83
106-41-030	Red Creek	3
District 106 Total		1,009
107-30-030	Toms Creek	103
107-40-007	Mill Creek	10
District 107 Total		113
109-20-007	Gut Bay	384
109-20-013	Falls Lake	328
109-45-013	Security Bay	50
109-52-035	Pillar Bay	944
District 109 Total		1,706

-continued-

Table 9. (page 2 of 2).

Location Code	System	Numbers Reported [a]
112-12-025	Basket Bay	316
112-67-058	Mitchell Bay	25
112-67-058	Kanalku	233
112-73-024	Hood Bay	50
District 112 Total		624
113-13-001	Redfish Bay	186
113-22-008	Poltofski Lake	177
113-34-005	Necker Bay	2,186
113-41-032	Salmon Lake	81
113-41-043	Redoubt Bay	334
113-43-001	Nakwasina	2
113-52-004	Lake Eva	10
113-59-004	Sitkoh Bay	322
113-61-003	Leo's Anchorage	159
113-72-002	Klag Bay	629
113-73-003	Ford Arm	12
113-94-002	Hodktaheen	20
District 113 Total		4,118
115-32-000	Chilkat Inlet	874
115-32-025	Chilkat River	1,775
115-32-031	Chilkat River (Klukwan)	779
115-33-000	Chilkoot Saltwater	1,013
District 115 Total		4,441
Unknown districts or systems		221
Total Southeast		20,097

[a] The number of sockeye salmon taken as reported on subsistence permits returned to ADF&G. Actual harvests are higher.

Table 10. Age composition of sockeye salmon in the commercial gill net harvest in Southeast Alaska and transboundary rivers, by district, 1988.

			Brood Year and Age Class														
			1986	1985		1984			1983			1982			1981		
District	Sample Size		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
101	4,745	Percent		0.1		1.4	27.6	<0.1	<0.1	27.8	35.7	<0.1	7.2	<0.1	<0.1		
		Catch		144		1,639	32,110	42	42	32,273	41,459	44	8,410	38	44		116,245
106-30	4,147	Percent		0.1	<0.1	0.5	22.8	0.1		52.7	12.2	0.1	11.4	<0.1	<0.1	<0.1	
		Catch		26	4	183	8,040	29		18,530	4,302	46	4,007	8	13	4	35,192
106-41	4,896	Percent		0.2	<0.1	1.0	24.0	0.1		55.5	9.3	0.4	9.3	<0.1		0.1	
		Catch		104	9	562	13,765	30		31,849	5,334	255	5,353	20		56	57,337
108-60	450	Percent		0.7		9.6	20.3		0.4	59.2	2.6	0.1	7.0				
		Catch		9		120	252		6	738	32	2	87				1,246
108 (Stikine)	2,603	Percent	0.1	2.9		6.6	29.1	<0.1	<0.1	52.1	5.1	0.1	3.9	0.1			
		Catch	13	362		843	3,706	4	6	6,636	649	8	500	9			12,736
111	5,285	Percent		0.9	0.1	9.8	16.3		0.1	61.4	4.3	0.7	6.4	<0.1	<0.1		
		Catch		335	21	3,819	6,389		42	24,054	1,688	279	2,515	18	8		39,168
111 (Taku)	988	Percent	0.1	2.2	0.3	13.2	23.2		0.1	52.3	2.3	0.5	5.8				
		Catch	8	269	33	1,585	2,783		16	6,287	271	62	700				12,014
115	11,062	Percent		<0.1		1.5	6.3	<0.1	<0.1	67.5	5.9	0.3	18.0	0.1	0.1	0.1	
		Catch		70		5,438	22,208	55	95	237,467	20,901	1,101	63,402	200	411	203	351,551
Total	34,176	Percent	<0.1	0.2	<0.1	2.3	14.3	<0.1	<0.1	57.2	11.9	0.3	13.6	<0.1	0.1	<0.1	
		Catch	21	1,319	67	14,189	89,253	160	207	357,834	74,636	1,797	84,974	293	476	263	625,489

Table 11. Average length of sockeye salmon in the commercial gill net catch in Southeast Alaska by sex, major age class, and district, 1988. [a]

Sex/ Age	Average Lengths (mm) by District						
	101	106-30	106-41	108	111	Taku 111 [b]	115
Male							
0.3	586	607	583	567	607	590	597
1.2	546	539	533	506	499	496	523
1.3	595	605	595	596	598	594	598
2.2	562	539	527	521	508	485	533
2.3	605	607	598	595	599	590	600
Total	571	579	570	568	570	555	589
Female							
0.3	559	571	558	578	579	570	584
1.2	537	537	526	515	526	512	504
1.3	582	589	578	579	580	573	581
2.2	552	545	531	503	523	511	529
2.3	587	596	577	573	576	581	591
Total	559	577	564	567	573	561	578
Sexes Combined							
0.3	576	577	566	578	590	579	593
1.2	541	538	530	509	506	501	519
1.3	587	596	585	588	586	581	589
2.2	556	542	531	511	512	489	530
2.3	603	602	586	580	588	584	595
Total	564	578	567	568	572	558	583

[a] Sample sizes and standard errors are presented in Appendix Tables B.1 through B.15 (McPherson, Olsen, and Rowse 1990).

[b] Canadian Taku inriver commercial gill net fishery.

Table 12. Average weight of sockeye salmon harvested in the Southeast Alaska gill net fisheries by statistical week, 1988.

Part A

Stat. Week	Average Weights (lbs) by District						
	101	102	106	107	108	111	115
25				7.00			
26	6.22		6.04		6.72	5.91	6.78
27	6.13		6.12		6.53	5.87	6.67
28	6.06		6.38		6.32	6.01	6.86
29	6.23		6.41		6.67	6.24	6.97
30	6.16		6.54	6.00		6.71	7.01
31	6.21		6.60	4.00		6.71	6.94
32	6.16		6.35	6.29		6.89	7.09
33	6.33	6.03	5.99	6.00		6.72	7.10
34	6.15	6.11	5.85			7.07	7.14
35	5.74	6.07	6.06			6.94	7.23
36	6.27		5.55			4.45	7.33
37	7.04					6.99	7.58
38	6.48					6.91	7.62
39	7.18						7.48
40							7.63
41							8.00
Average	6.16	6.05	6.39	6.13	6.55	6.42	7.04
Total lbs. Caught	879,646	1,029	590,823	196	8,157	251,325	2,475,556

Part B

Stat. Week	Average Weights (kgs) by District						
	101	102	106	107	108	111	115
25				3.18			
26	2.82		2.74		3.05	2.68	3.08
27	2.78		2.78		2.96	2.66	3.03
28	2.75		2.90		2.87	2.73	3.11
29	2.83		2.91		3.03	2.83	3.16
30	2.80		2.96	2.72		3.05	3.18
31	2.82		2.99	1.81		3.04	3.15
32	2.79		2.88	2.85		3.13	3.21
33	2.87	2.74	2.72	2.72		3.05	3.22
34	2.79	2.77	2.65			3.21	3.24
35	2.60	2.75	2.75			3.15	3.28
36	2.84		2.52			2.02	3.32
37	3.20					3.17	3.44
38	2.94					3.13	3.46
39	3.26						3.39
40							3.46
41							3.63
Average	2.79	2.75	2.90	2.78	2.97	2.91	3.19
Total kgs. Caught	399,005	467	267,996	89	3,700	114,000	1,122,905

Table 13. Age composition of sockeye salmon in the commercial purse seine harvest in Southeast Alaska by district, 1988.

District	Sample Size		Brood Year and Age Class																Total
			1986	1985		1984			1983				1982			1981			
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	
101	2,079	Percent		0.2	0.4	0.1	54.8	0.6		21.1	17.6		0.4	4.9	<0.1				
		Catch		53	114	26	17,889	195		6,901	5,735		135	1,611	16				32,675
102	747	Percent			0.3	0.6	52.1	0.4		27.3	14.3			5.0				0.1	
		Catch			42	85	7,702	57		4,042	2,122			734				14	14,798
103	317	Percent		0.3			69.4	0.9		17.0	8.8			3.2	0.3				
		Catch		8			1,654	23		406	210			74	8				2,383
104 North	4,998	Percent		<0.1	0.8	0.3	70.2	0.4		20.1	6.2		<0.1	1.9	<0.1				
		Catch		123	3,085	1,108	265,884	1,489		76,038	23,350		166	7,221	166				378,630
104 South	3,852	Percent		0.1	0.3	0.3	63.2	0.2	<0.1	25.6	7.4		0.1	2.9					
		Catch		183	732	739	134,378	320	11	54,386	15,699		141	6,066					212,655
105	71	Percent			1.4		80.3			15.5	2.8								
		Catch			4		205			40	6								255
109	1,251	Percent	<0.1	0.1	0.5	0.5	54.4	1.0		23.1	10.2	<0.1	0.1	7.2	2.6		0.2	<0.1	
		Catch	3	7	34	38	3,837	66		1,631	718	3	9	509	179		12	3	7,049
112	518	Percent		0.5	0.7	1.9	46.6	0.4		31.7	13.0		0.4	4.7		0.1			
		Catch		18	28	76	1,799	16		1,221	503		14	182		4			3,861
113	577	Percent				0.2	6.4	2.1		10.1	35.1	0.2		27.3	15.1		3.2	0.4	
		Catch				2	70	22		111	384	2		298	165		34	4	1,092
114	242	Percent		1.2	1.2	2.9	26.4	2.5		31.4	15.3		0.4	18.2	0.4				
		Catch		15	15	36	329	31		392	190		5	226	5				1,244
Total	14,652	Percent	<0.1	0.1	0.6	0.3	66.3	0.3	<0.1	22.2	7.5	<0.1	0.1	2.6	0.1	<0.1	<0.1	<0.1	
		Catch	3	407	4,054	2,110	433,747	2,219	11	145,168	48,917	5	470	16,921	539	4	46	21	654,642

Table 14. Average length of sockeye salmon in the commercial purse seine catch in Southeast Alaska by sex, major age class, and district, 1988. [a]

Sex/ Age	Average Lengths (mm) by District									
				104						
	101	102	103	North	South [b]	105	109	112	113	114
Male										
0.3	NA	588	NA	530	565	NA	573	594	615	593
1.2	526	521	536	520	520	520	487	509	489	508
1.3	590	586	585	586	598	595	543	578	561	596
2.2	538	527	554	544	549	608	498	516	536	513
2.3	617	549	568	612	619	NA	586	609	592	594
Total	544	535	543	535	551	535	504	541	543	555
Female										
0.3	NA	545	NA	544	564	NA	580	577	NA	578
1.2	519	513	522	517	515	518	482	492	516	498
1.3	571	572	577	572	573	582	549	568	558	569
2.2	534	505	511	537	529	561	484	515	522	527
2.3	581	588	589	598	589	NA	556	582	569	579
Total	536	531	533	529	533	527	518	524	545	534
Sexes Combined										
0.3	NA	563	NA	550	563	NA	577	587	615	588
1.2	522	515	527	518	516	519	485	500	497	502
1.3	578	576	579	579	577	588	549	573	559	582
2.2	539	517	527	541	538	585	490	516	530	521
2.3	599	575	583	608	602	NA	569	598	575	586
Total	539	533	536	532	537	530	510	531	543	543

[a] Sample sizes and standard errors are presented in Appendix Tables C.1 through C.20 (McPherson, Olsen, and Rowse 1990).

[b] District 104 North includes subdistricts 30, 35, 40, 50, and District 104 South includes

Table 15. Average weight of sockeye salmon harvested in the Southeast Alaska purse seine fisheries by statistical week, 1988.

Part A

Stat. Week	Average Weights (lbs) by District									
	101	102	103	104	105	109	110	112	113	114
28	5.76			5.87				5.73		7.20
29	5.71	5.58		5.52		5.80	7.15	6.02	5.59	5.82
30	5.90	5.38		5.33		4.91		5.73		6.00
31	5.45			5.51	5.15	5.58		6.34	4.00	6.06
32	5.66	5.86		5.14		6.19				
33	5.60	5.76		5.36		5.31		5.50	5.75	
34	5.55	5.48	5.36	5.42		5.30		5.42	3.67	
35	6.29	5.48	5.54	5.57		5.52		5.87	4.00	5.95
36	5.00	5.55	5.11	5.50	5.00	5.15		5.96		
37	8.00	5.36	5.65			5.00				
38	4.22	5.44	5.50							5.00
39		5.21								
40		4.50								
41		6.00								
Average	5.64	5.71	5.43	5.34	5.14	5.17	7.15	5.74	5.70	5.95
Total lbs. Caught	197,815	84,451	12,932	3,158,622	1,311	36,474	236	22,172	6,442	7,404

Part B

Stat. Week	Average Weights (kgs) by District									
	101	102	103	104	105	109	110	112	113	114
28	2.61			2.66				2.60		3.27
29	2.59	2.53		2.50		2.63	3.24	2.73	2.54	2.64
30	2.67	2.44		2.42		2.23		2.60		2.72
31	2.47			2.50	2.33	2.53		2.88	1.81	2.75
32	2.57	2.66		2.33		2.81				
33	2.54	2.61		2.43		2.41		2.50	2.61	
34	2.52	2.49	2.43	2.46		2.40		2.46	1.66	
35	2.85	2.48	2.52	2.53		2.51		2.66	1.81	2.70
36	2.27	2.52	2.32	2.50	2.27	2.34		2.70		
37	3.63	2.43	2.56			2.27				
38	1.92	2.47	2.49							2.27
39		2.36								
40		2.04								
41		2.72								
Average	2.56	2.59	2.46	2.42	2.33	2.35	3.24	2.60	2.59	2.70
Total kgs. Caught	89,728	38,307	5,866	1,432,742	595	16,544	107	10,057	2,922	3,358

Table 16. Mean statistical week (MSW) and standard deviation (SD) of sockeye salmon migration through the gill net fisheries in Southeast Alaska by age, 1988.

		Brood year and age class					
		1984		1983		1982	
District		0.3	1.2	1.3	2.2	2.3	Total
101	MSW	26.6	29.8	28.2	28.4	28.4	28.7
	SD	1.0	2.1	2.0	1.9	2.1	2.1
106-30	MSW	29.6	30.6	29.7	30.0	29.8	30.0
	SD	1.5	2.1	1.7	2.1	1.7	1.9
106-41	MSW	28.9	30.1	29.5	29.7	29.9	29.7
	SD	1.2	1.9	1.7	1.8	1.7	1.8
108 Can	MSW	31.3	31.3	31.3	31.1	30.6	31.3
	SD	1.5	1.6	1.6	1.6	1.9	1.6
111	MSW	30.5	29.2	29.6	30.8	30.6	29.8
	SD	1.8	2.6	2.2	2.7	2.5	2.3
111 Can	MSW	31.7	29.6	30.1	29.4	29.5	30.2
	SD	2.0	2.4	2.1	1.9	1.7	2.2
115	MSW	29.3	31.4	31.1	32.9	33.1	31.6
	SD	2.1	2.1	2.5	2.6	2.7	2.6

Inclusive dates for mean statistical weeks are:

Statistical week 26 (June 19 - June 25)
Statistical week 27 (June 26 - July 02)
Statistical week 28 (July 03 - July 09)
Statistical week 29 (July 10 - July 16)
Statistical week 30 (July 17 - July 23)
Statistical week 31 (July 24 - July 30)
Statistical week 32 (July 31 - August 06)
Statistical week 33 (August 07 - August 13)

Table 17. Mean statistical week (MSW) and standard deviation (SD) of sockeye salmon migration through the purse seine fisheries in Southeast Alaska by age, 1988.

		Brood year and age class					
		1984		1983		1981	
District		0.3	1.2	1.3	2.2	2.3	Total
101	MSW	28.9	31.5	30.8	31.1	31.1	31.2
	SD	0.3	1.2	1.5	1.4	1.4	1.4
104 North	MSW	29.9	31.6	30.6	31.0	30.6	31.3
	SD	1.6	1.5	1.8	1.9	1.8	1.7
104 South	MSW	29.2	31.0	30.0	30.3	30.1	30.6
	SD	0.5	1.8	1.6	1.9	1.6	1.8
109	MSW	32.3	30.4	30.9	33.0	31.4	30.9
	SD	0.8	1.3	1.5	0.0	1.6	1.6
112	MSW	30.0	31.0	30.0	32.0	32.7	30.9
	SD	1.9	2.8	2.2	2.7	2.5	2.7

Inclusive dates for mean statistical weeks are:

Statistical week 28 (July 03 - July 09)
Statistical week 29 (July 10 - July 16)
Statistical week 30 (July 17 - July 23)
Statistical week 31 (July 24 - July 30)
Statistical week 32 (July 31 - August 06)
Statistical week 33 (August 07 - August 13)

Table 18. Weir counts or estimated escapement counts for Southeast Alaska and transboundary river sockeye salmon systems, 1988. Abbreviations for types of surveys and escapement counts are as follows: (A) aerial, (B) boat, (F) foot, (T) tagging estimate, (W) weir.

Stream Number	Stream Name	Count	Method	Dates
101-30-075	Hugh Smith-Sockeye Creek	4,960	W	06/05-10/04
101-45-032	Leask Lake	128	F	09/21
101-47-013	Ward Creek	175	F	10/05
101-80-068	McDonald Lake-Wolverine Creek	70,335	[a]	
		33,000	F	09/16
101-90-050	Naha River	1,340	W	07/04-08/25
101-90-084	Helm Lake	50	A	07/18
102-30-067	Kegan Lake Creek	2,000	F	09/22
102-60-087	Karta River	3,151	W	06/25-08/25
103-60-047	Klawock Lake	3,426	W	08/11-10/13
105-42-014	Sutter Creek	30	A	07/19
106-10-010	Ratz Harbor Creek	250	A	09/09
106-10-034	Luck Creek-Luck Lake	2,400	A	09/09
106-41-010	Salmon Bay Lake Creek	22,210	W	07/03-09/12
106-41-012	Salmon Bay Lake South Head	7,289	F	09/09
106-41-015	Salmon Bay Lake West Head	3,177	F	09/07
106-41-030	Red Lake Creek	2,200	A	07/19
106-41-032	Red Lake Head	1,832	F	09/07
106-42-010	Kah Sheets Creek	200	F	07/17
106-44-060	Petersburg Lake Creek	190	F	09/07
107-30-030	Thoms Lake Creek	1,240	F	09/06
107-40-047	Tom Lake Creek	150	A	08/23
108-40-020	Andrews Creek	210	[b]	08/16
108-70-020	Stikine River	17,747		
108-80-260	Chutine River	289	B	09/07
108-80-110	Tahltan Lake	2,523	W	07/15-08/29
109-20-013	Falls Creek-Baranof Island	1,114	W	7/9-8/11
109-52-035	Kutlaku Lake Creek	1,000	F	09/08
109-62-013	Aleck's Creek	2,600	A	08/29
110-34-003	Rusty River	100	A	08/17
111-32-032	Taku River-total Canadian Drainage	74,055	[c]	
111-32-066	Yehring Creek	336 [d]	W	08/12-10/22
111-32-201	Stuhini Creek	30	F	09/26
111-32-202	Stuhini Lake	200	H	09/26
111-32-203	Tuskwa Slough	110	F	09/26
111-32-204	Coffee's Slough	50	H	09/26
111-32	Chum Slough	1,300	H	09/26
111-32	Yonakina Slough	55	F	09/26
111-32-245	Little Trapper Lake	10,629	W	07/26-09/12
111-32-254	Little Tatsamenie Lake	2,063	W	08/10-09/27
111-32-260	Hackett River	516	W	08/08-09/20
111-32-270	Nahlin River	138	W	07/25-09/23
111-33-034	Speel Lake	969	W	07/15-08/30
111-35-006	Crescent Lake	1,199	W	07/11-08/28
111-50-006	Windfall Lake	925	F	08/12
111-50-042	Auke Creek	1,392	W	07/09-09/15
111-50-056	Steep Creek	520	F	08/09
112-12-027	Kook Creek Inlet	300	A	08/16
112-67-060	Kanalku Creek	300	A	09/07
113-13-001	Redfish Bay Head	200	A	07/31
113-34-005	Necker Bay Lake	4,000	A	07/31
113-41-043	Redoubt Lake Outlet	1,889	W	07/23-09/22
113-52-004	Hanus Bay	300	A	07/26
113-73-003	Ford Arm Lake	1,455 [e]	T	10/23
115-20-020	Lace River	306	A	08/04
115-20-030	Antler/Gilkey River	300	A	08/04
115-32	Chilkat River			
115-32-032	Chilkat Lake Outlet	27,593	W	06/18-11/14
115-32-060	Mosquito Lake	250	A	08/15
115-32-061	Mule Meadows	450	A	08/15
115-32-062	Bear Flats	550	A	10/12
115-32-064	Kelsall River	200	A	08/15
115-33-020	Chilkoot Lake Outlet	81,274	W	06/09-10/25
115-33-020	Chilkoot River	8,500	A	10/24

[a] Tim Zadina, ADF&G, F.R.E.D., Ketchikan; personal communication. Estimate based on stream life - foot survey.

[b] From Jensen and Frank (1989). Estimate based on scale patterns and migratory time density from inriver test fish CPUE data.

[c] From McGregor and Clark (1989). Estimate based on Chapman/Junge and Darroch stratified Petersen mark/recapture method.

[d] Incomplete count.

[e] Leon Shaul, ADF&G, DCF, Juneau; personal communication. Estimate from Petersen mark/recapture method. 95% confidence interval = 908 - 2,002.

Table 19. Sample size and percentage age composition of sockeye salmon in escapements to Southeast Alaska and transboundary rivers in 1988.

Stream	System	Sample	Brood Year and Age Class													
			1986	1985		1984			1983			1982			1981	
Number	Name	Size	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
101-30-075	Hugh Smith	2,980			0.1		37.9	0.1		20.7	24.3	1.3	15.6			<0.1
101-45-032	Leask	133			2.3		7.5	9.8		0.8	76.7		3.0			
101-55-073	Bakewell	218					95.9			1.4	2.3		0.5			
101-80-068	McDonald	1,069			0.3		19.5			64.1	5.8	0.1	10.3			
101-90-050	Naha	1,130			0.1		17.5			61.4	1.6	0.6	18.7		0.1	
101-90-084	Helm	219			4.1		66.2			10.0	19.2		0.5			
102-30-067	Kegan	522			1.1		43.9	0.6		36.6	14.8		3.1			
102-60-087	Karta	1,343				<0.1	31.2		<0.1	56.5	5.0	1.8	5.1		0.3	
103-15-027	Klakas	330					36.7			57.3	3.3	0.3	2.4			
103-25-047	Hetta	371			5.7		49.1			43.1	1.6	0.3	0.3			
103-60-047	Klawock	561					35.3			41.9	12.3	0.4	10.0		0.2	
103-90-010	Sarkar	194					44.8	3.6		8.2	29.4		13.4			0.5
106-10-034	Luck	56					64.3			17.9	17.9					
106-30-051	Galea	145					57.9			24.1	14.5		3.4			
106-41-010	Salmon Bay	2,079			0.4		84.1	0.3		9.6	2.9	0.3	2.5			
106-41-030	Red Bay	328			0.3		51.8			35.7	4.6		7.6			
106-42-010	Kah Sheets	17					11.8			5.9	70.6		11.8			
106-44-060	Petersburg	210			6.7		9.0	11.0		17.1	45.7		10.5			
107-30-030	Thoms	259			0.4		3.5	0.8		0.8	74.1		20.1		0.4	
108-70-080	Varrett	90				2.2	21.1			72.2	1.1	1.1	2.2			
108-80	Stikine River															
108-80-002	Mainstem	25		4.0		8.0	20.0			64.0		4.0				
108-80-035	Scud	63		3.2		6.3	28.6			61.9						
108-80-060	Chutine R.	113		0.9		5.3	5.3			86.7			1.8			
108-80-061	Chutine L.	126			0.8		22.2			18.3	37.3		21.4			
108-80-110	Tahltan	697					31.5			54.6	2.8	0.4	10.7			0.1
109-20-013	Falls	406					47.3			41.6	4.2	0.5	6.4			
109-52-035	Kutlaku	276			2.9		70.7			25.7	0.7					
109-62-013	Alecks L.	536			3.0		75.6	3.0		13.6	1.9		3.0			
111-32-032	Taku (Canyon Is.)	2,450	0.3	6.5	6.2	8.0	29.8	0.3		38.7	5.6	0.1	4.6	0.1		
111-32-066	Yehring Cr.	190		2.1		1.1	26.8			68.4	0.5		1.1			
111-32-203	Tuskwa Slough	109		29.4	3.7	29.4	5.5			31.2			0.9			
111-32-204	Coffee's Slough	1		100.0												
111-32	Yonakina Slough	50	2.0	16.0	6.0	14.0	32.0			28.0			2.0			
111-32	Shustahini Sl.	111		9.0	2.7	27.9	9.0			50.5			0.9			
111-32-235	Kuthai Lake	375					42.9			46.4	2.9		7.7			
111-32-245	L. Trapper L.	692				0.1	10.6			71.8	7.0		10.5			
111-32-254	L. Tatsamenie L.	552		2.8	2.0	1.9	40.1			43.1	6.7		3.5			
111-32-260	Hackett R.	403	0.2	16.4		53.6	14.1			15.4			0.2			
111-32-270	Nahlin R.	256	0.4	0.4		19.9	8.2			69.5	0.4	0.8	0.4			
111-33-034	Speel	659			0.1		40.8			49.9	7.3	0.1	1.7			
111-35-006	Crescent	412					22.4		0.5	32.2	5.9	24.7	13.4		0.7	0.2
111-50-006	Windfall	217			0.5		4.1			94.9			0.5			
111-50-042	Auke	306			1.0		6.9	1.3		1.6	25.8		63.1		0.3	
111-50-056	Steep	274		0.4	0.7	1.5	7.3			84.3	1.5		4.4			
113-41-043	Redoubt	370					12.8			20.0	56.9		10.3			
113-73-003	Ford Arm	325			1.2	0.3	45.8	2.2		35.1	9.2		6.2			
115-20-020	Lace	109				7.3	10.1			82.6						
115-32-032	Chilkat L.	1,918				<0.1	0.5			26.6	12.1	0.1	60.3	0.2	<0.1	0.1
115-32-062	Bear Flats	93	1.1	36.6	1.1	32.3	23.7			5.4						
115-33-020	Chilkoot	2,661					4.0			78.1	2.6	1.3	13.6		0.4	0.1

Table 20. Average length of sockeye salmon in escapements in Southeast Alaska and transboundary river systems, 1988. [a]

Statistical Code	System	Brood Year and Age Class					Total
		1984		1983		1982	
		0.3	1.2	1.3	2.2	2.3	
101-30-075	Hugh Smith		526	591	527	595	554
101-45-032	Leask		478		502		488
101-55-073	Bakewell		528		518		528
101-80-070	McDonald		512	593	512	595	572
101-90-050	Heckman (Naha)		544	601	534	598	590
101-90-084	Helm		472	526	467		471
102-30-067	Kegan		519	577	510	579	538
102-60-087	Karta		551	599	547	599	582
103-15-027	Klakas		511	560	509	581	541
103-25-047	Hetta		490	555	514		509
103-60-047	Klawock		524	577	524	574	551
103-90-014	Sarkar		483	545	503	554	501
106-10-034	Luck		461	580	428		475
106-30-051	Galea		485	556	498	550	507
106-41-010	Salmon Bay		509	570	508	572	516
106-41-030	Red Bay		477	563	473	562	513
106-42-010	Kah Sheets				465		486
106-44-060	Petersburg		460	562	461	550	462
107-30-030	Thoms		440		507	569	516
108-80	Stikine River						
108-70-080	Varrett River		534	563			557
108-80-002	Stikine Mainstem		501	597			568
108-80-035	Scud		517	592			566
108-80-060	Chutine R.	567	501	580			575
108-80-061	Chutine L.		491	586	493	582	527
108-80-110	Tahltan		513	591	518	591	565
109-20-013	Falls Lake		497	558	510	566	528
109-52-035	Kutlaku		462	529			476
109-62-013	Alecks L.		461	521	471	525	465
111-32	Taku River						
111-32-032	Canyon Is.						
111-32-066	Yehring Cr.		486	575			548
111-32-203	Tuskwa Slough	589	471	584			529
111-32-204	Coffee Slough						
111-32	Yonakina Sl.	580	445	581			492
111-32	Shustahini Sl.	584	453	592			557
111-32-235	Kuthai Lake		490	562	481	567	529
111-32-245	L. Trapper L.		461	567	463	571	548
111-32-254	L. Tatsamenie L.	583	540	578	533	594	557
111-32-260	Hackett R.	582	488	578			547
111-32-270	Nahlin R.	578	494	579			570
111-33-034	Speel		490	598	495	587	545
111-35-006	Crescent		462	589	462	572	555
111-50-006	Windfall		471	555			550
111-50-042	Auke		480	558	490	550	524
111-50-056	Steep		487	552		573	546
113-41-043	Redoubt		526	565	522	565	536
113-73-003	Ford Arm	555	487	538	487	552	504
115-24-020	Lace	569	504	576			568
115-32-032	Chilkat L.		538	611	565	625	616
115-32-062	Chilkat Mainstem	554	453	549			480
115-33-020	Chilkoot		490	578	495	574	573

[a] Age classes with sample size less than five not listed. Sample sizes and standard errors are presented in McPherson, Olsen, and Rowse 1990.

Table 21. Sockeye salmon run timing through weirs in Southeast Alaska and transboundary river systems, 1988.

System	Dates of Operation	Count	Cumulative % Past Weir			Mean Date [a]	Standard Deviation [b]
			10%	50%	90%		
Hugh Smith	06/05-10/04	4,960	07/19	08/09	08/29	08/09	20.1
Naha	07/04-08/25	1,340	07/08	07/16	08/02	07/19	10.2
Karta	06/25-08/25	3,151	06/27	07/17	08/13	07/15	17.9
Klawock	08/11-10/13	3,426	08/30	09/09	09/18	09/09	7.3
Salmon Bay	07/03-09/12	22,210	07/24	08/06	08/28	08/04	11.9
Tahltan	07/15-08/29	2,523	07/25	08/06	08/14	08/05	8.1
Falls	07/09-08/11	1,114	07/15	07/24	08/08	07/25	8.3
L. Trapper	07/26-09/12	10,629	08/02	08/08	08/19	08/10	7.3
L. Tatsamenie	08/10-09/27	2,063	08/21	08/29	09/19	09/02	11.1
Hackett	08/08-09/20	516	08/17	08/27	09/15	08/30	13.4
Yehring	08/12-10/22	336	08/23	09/03	09/30	09/06	14.6
Speel	07/15-08/30	969	08/03	08/16	08/26	08/15	9.1
Crescent	07/11-08/28	1,199	07/22	08/15	08/22	08/11	11.9
Auke	07/09-09/15	1,392	07/11	07/18	08/09	07/23	13.6
Redoubt	07/23-09/22	1,889	07/25	08/10	08/30	08/11	12.6
Chilkat	06/18-11/14	27,593	07/19	09/06	09/28	08/31	29.2
Chilkoot	06/09-10/25	81,274	06/29	07/26	08/28	07/26	24.9

[a] Rounded to nearest calendar date.
[b] Standard deviation of mean timing date in days.

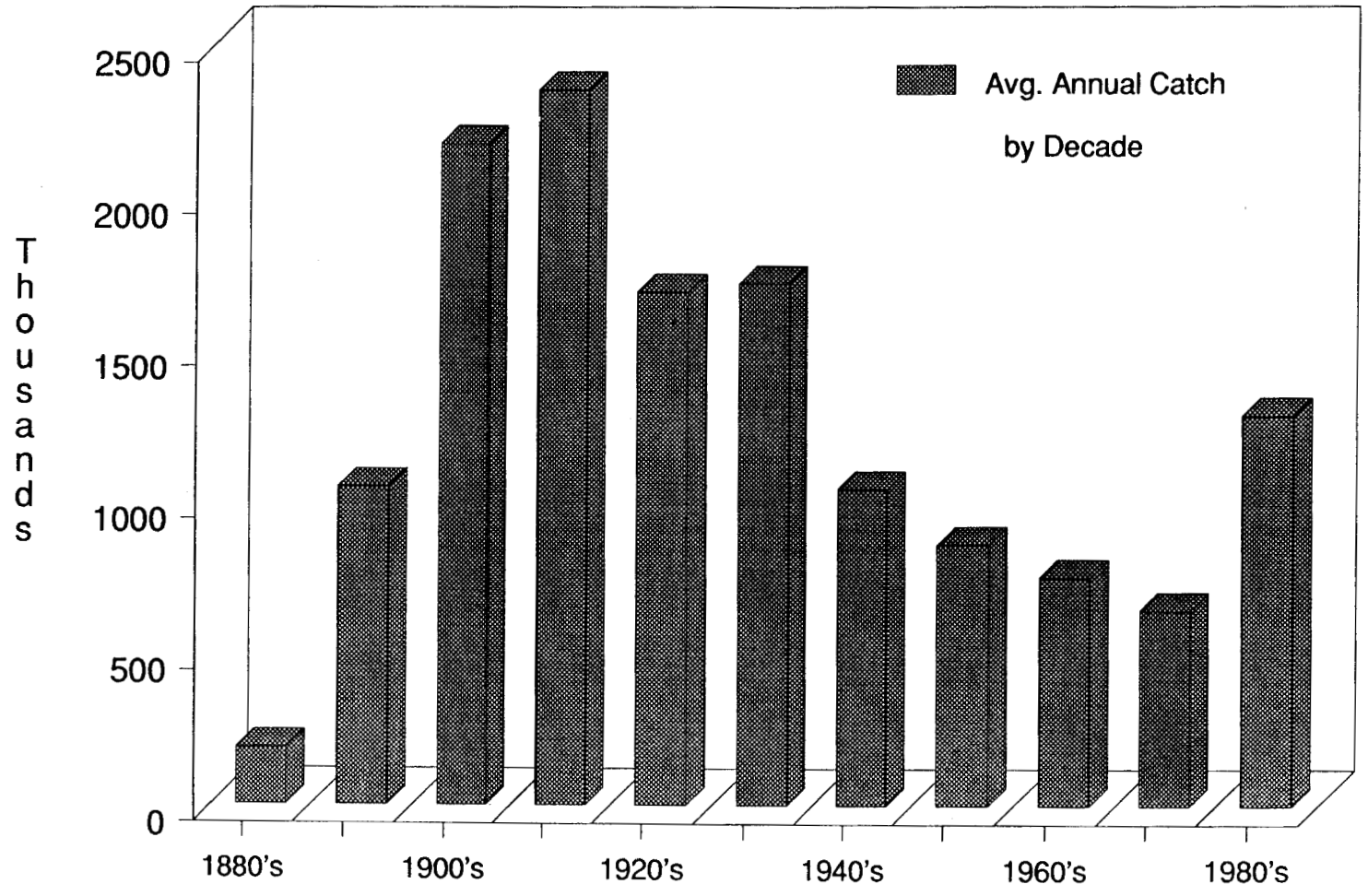

Figure 1. Average annual decade sockeye catch in Southeast Alaska, 1880-1988.

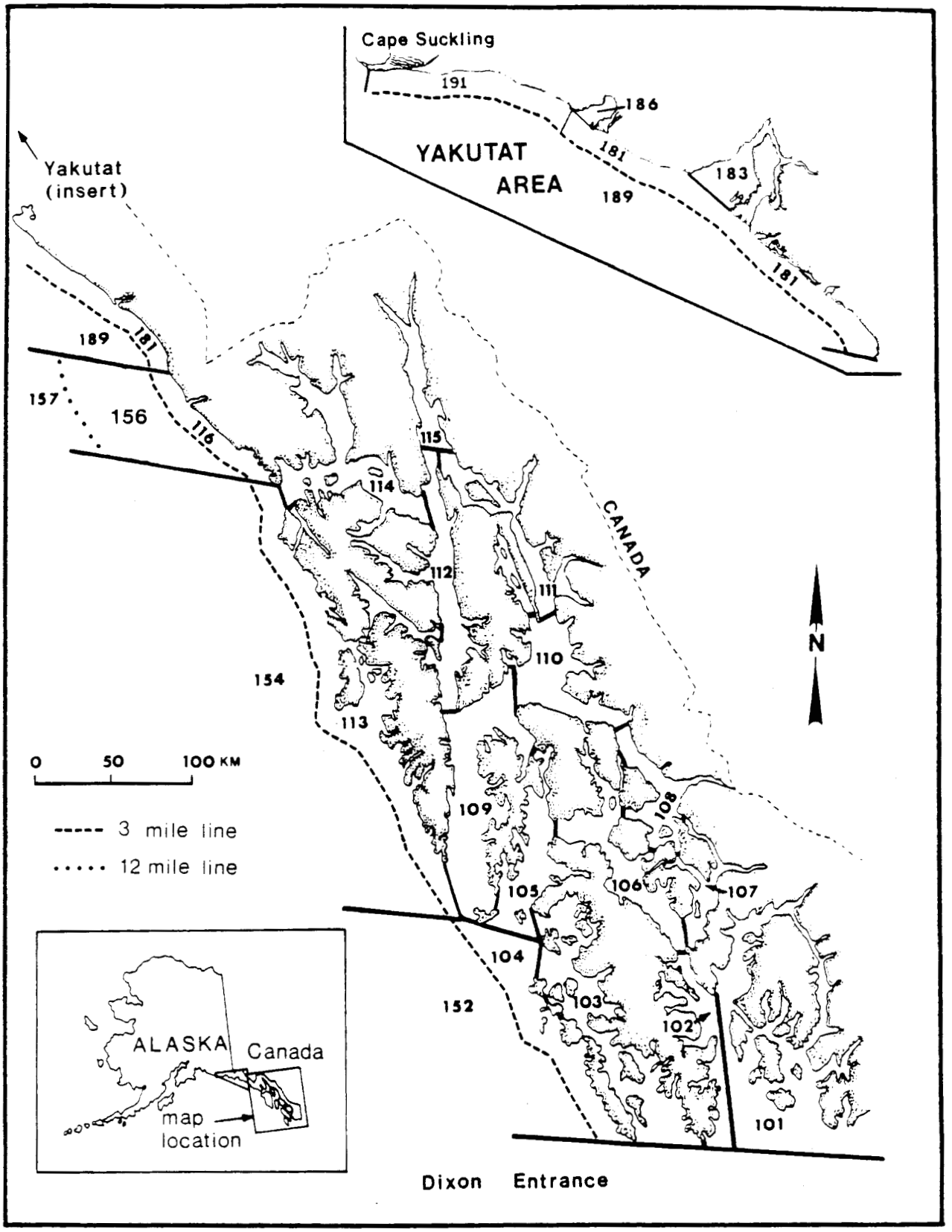

Figure 2. Map of southeast Alaska showing the statistical fishing districts.

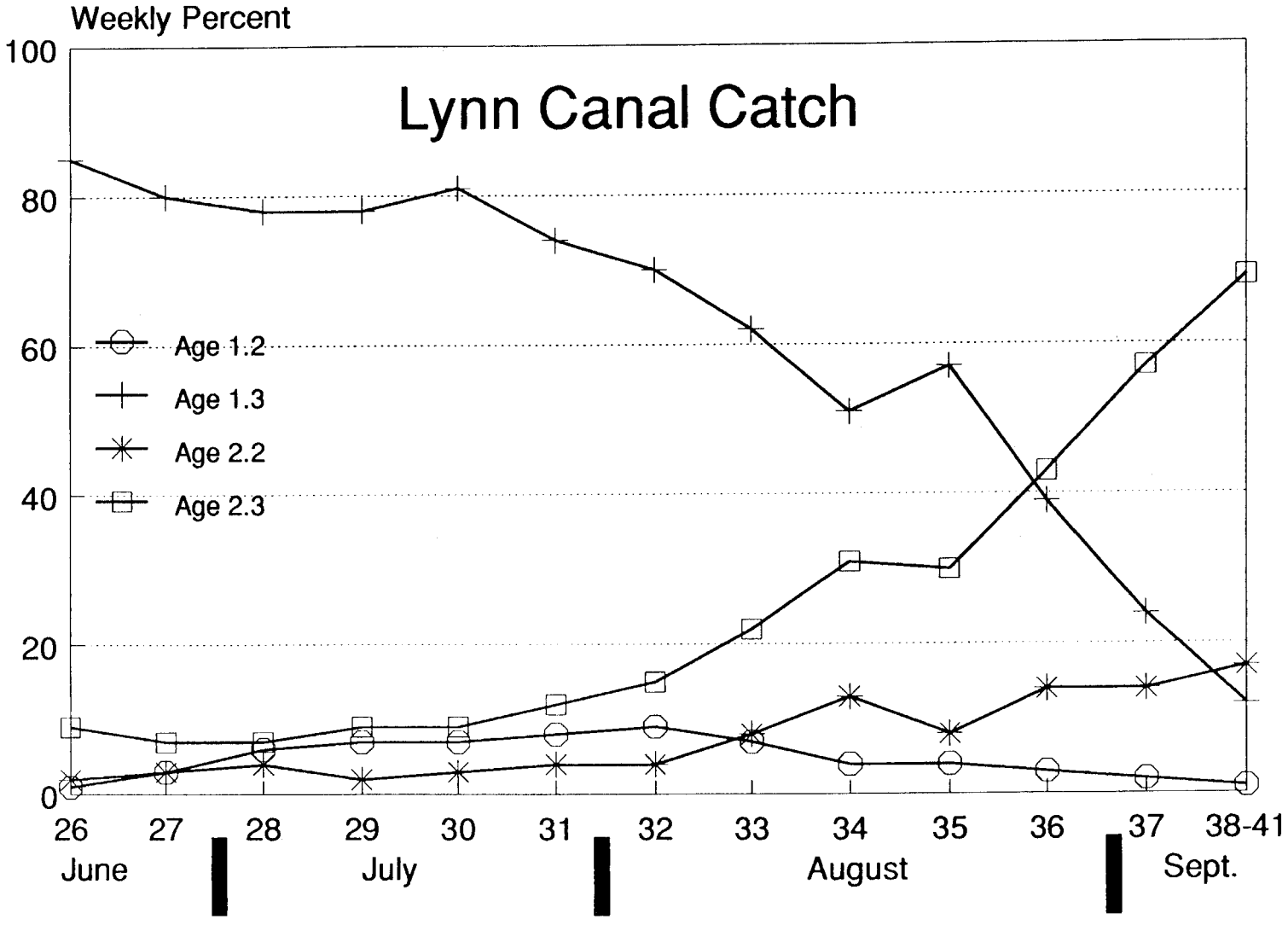

Figure 3. Age composition of sockeye salmon in the Lynn Canal drift gill net fishery, 1988.

APPENDICES

Appendix A.1 Numbered calendar weeks (i.e., Stat Weeks) used to report commercial catches, 1988.

Week Number	From	To	Week Number	From	To
1	Jan 1	Jan 2	28	Jul 3	Jul 9
2	Jan 3	Jan 9	29	Jul 10	Jul 16
3	Jan 10	Jan 16	30	Jul 17	Jul 23
4	Jan 17	Jan 23	31	Jul 24	Jul 30
5	Jan 24	Jan 30	32	Jul 31	Aug 6
6	Jan 31	Feb 6	33	Aug 7	Aug 13
7	Feb 7	Feb 13	34	Aug 14	Aug 20
8	Feb 14	Feb 20	35	Aug 21	Aug 27
9	Feb 21	Feb 27	36	Aug 28	Sep 3
10	Feb 28	Mar 5	37	Sep 4	Sep 10
11	Mar 6	Mar 12	38	Sep 11	Sep 17
12	Mar 13	Mar 19	39	Sep 18	Sep 24
13	Mar 20	Mar 26	40	Sep 25	Oct 1
14	Mar 27	Apr 2	41	Oct 2	Oct 8
15	Apr 3	Apr 9	42	Oct 9	Oct 15
16	Apr 10	Apr 16	43	Oct 16	Oct 22
17	Apr 17	Apr 23	44	Oct 23	Oct 29
18	Apr 24	Apr 30	45	Oct 30	Nov 5
19	May 1	May 7	46	Nov 6	Nov 12
20	May 8	May 14	47	Nov 13	Nov 19
21	May 15	May 21	48	Nov 20	Nov 26
22	May 22	May 28	49	Nov 27	Dec 3
23	May 29	Jun 4	50	Dec 4	Dec 10
24	Jun 5	Jun 11	51	Dec 11	Dec 17
25	Jun 12	Jun 18	52	Dec 18	Dec 24
26	Jun 19	Jun 25	53	Dec 25	Dec 31
27	Jun 26	Jul 2			

Appendix A.2. Sample size needed to describe the age composition of a two-, three-, four-, five-, six-, or seven-age-class population of increasing size with a precision of ± 5% and a probability of 0.10.

	Sample Size Needed With The Following Number of Groups[a]					
Population Size	2	3	4	5	6	7
500	218	238	251	261	267	273
1,000	278	312	334	352	364	376
1,500	307	349	376	399	414	429
2,000	323	370	401	427	445	462
2,500	334	384	418	446	466	485
3,000	341	394	430	460	481	501
3,500	347	402	439	470	492	513
4,000	351	408	446	478	501	523
4,500	355	412	452	485	508	530
5,000	358	416	456	490	513	537
6,000	362	422	463	498	522	546
7,000	365	426	468	504	529	554
8,000	367	430	472	509	534	559
9,000	369	432	476	512	538	563
10,000	371	434	478	515	541	567
15,000	375	441	486	524	551	578
20,000	378	444	490	529	556	583
25,000	379	446	492	531	559	587
30,000	380	447	494	533	561	589
35,000	381	448	495	535	563	591
40,000	381	449	496	536	564	592
45,000	382	449	496	537	565	593
50,000	382	450	497	537	566	594
60,000	383	451	498	538	567	595
70,000	383	451	498	539	567	596
80,000	383	451	499	539	568	597
90,000	383	452	499	540	568	597
100,000	384	452	499	540	569	597
infinite	385	454	502	543	572	601

[a] Based on Cochran (1977) using the following formula:

$$n' = \frac{n_o}{1 + \frac{(n_o - 1)}{N}}$$

Where: n' = adjusted sample size
n_o = sample size needed for an infinitely large population
N = population size

Appendix B.1. Age composition of sockeye salmon in the commercial gill net harvests in Southeast Alaska by district, 1981 to 1988.

District	Year	Catch	Sample Size	Percent by Age Class																	
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	1.5	2.4	3.3	4.2	4.3
101	1981	104,853	162					44.4			19.8	29.0			6.8						
Tree	1982	233,702	3,082		0.1			6.3	<0.1		67.8	20.1			5.7	<0.1		<0.1			
Point	1983	136,006	5,649		<0.1	<0.1	0.4	13.1			41.3	25.9		0.2	18.9	0.1					
	1984	88,226	5,904		0.1		1.6	13.2			38.6	32.5		<0.1	14.0	<0.1					
	1985	223,744	7,181		0.1	<0.1	1.9	14.8	<0.1	<0.1	49.0	19.5		0.1	14.4	<0.1					
	1986	145,631	6,511		0.2	<0.1	0.4	15.0			41.1	27.5		0.1	15.3	0.2			0.1		
	1987	107,580	6,001	<0.1	0.1	0.2	1.5	8.4	0.1		52.7	27.5			9.3	0.1		<0.1	0.2	<0.1	
	1988	116,245	4,745		0.1		1.4	27.6	<0.1	<0.1	27.8	35.7		<0.1	7.2	<0.1		<0.1			
106	1982	193,618	2,497				0.2	3.1	<0.1		83.8	3.9		0.1	8.8				<0.1		
	1983	48,942	5,272		0.1	0.1	0.4	16.0			63.1	9.3		0.4	10.6			<0.1			
	1984	91,789	6,316		<0.1	<0.1	0.3	24.2	<0.1		53.8	10.3			11.4						
106-30	1985	92,979	6,095		<0.1	<0.1	0.7	6.1	0.1		78.0	6.1	<0.1	0.2	8.8	<0.1		<0.1	<0.1		
Upper	1986	60,462	4,537		<0.1	<0.1	0.5	13.9	<0.1		54.7	13.3		0.3	17.0	0.1		0.1	<0.1		
Clarence	1987	57,262	4,372				0.2	8.7	0.1		63.2	8.0		0.1	19.4	0.1		0.1	0.1		
Strait	1988	35,192	4,147		0.1	<0.1	0.5	22.8	0.1		52.7	12.2		0.1	11.4	<0.1		<0.1	<0.1		
106-41	1985	172,088	5,978			<0.1	0.5	6.7			78.3	4.5		0.1	9.8	<0.1	<0.1	<0.1	<0.1		
Sumner	1986	85,243	5,220				0.3	13.5			56.5	12.6		0.5	16.3	0.1		0.1	<0.1		
Strait	1987	79,165	5,097		0.1	<0.1	0.8	8.6	<0.1		65.8	7.9		0.2	16.2	0.3	<0.1	<0.1	0.1		
	1988	57,337	4,896		0.2	<0.1	1.0	24.0	0.1		55.5	9.3		0.4	9.3	<0.1			0.1		
108	1982	6,553	792				0.3	2.9		0.1	81.3	2.1			13.3						
Stikine	1983	187	11					18.2			27.3				54.5						
River	1984	1,290	657		0.2		8.2	3.5			82.3	0.6			5.2						
Mouth	1985	1,066	448		0.2		6.3	7.4		0.2	81.7	0.7		2.5	1.1						
	1986	4,187	1,378		0.4		6.3	4.8			83.5	1.6		0.2	3.2						
	1987	1,620	92				10.9	6.5			68.5	2.2			12.0						
	1988	1,246	450		0.7		9.6	20.3		0.4	59.3	2.6		0.1	7.0						
108	1979	10,534	98		1.0		3.1	28.6			60.2	5.1			2.0						
Canada	1980	18,119			0.9	0.5	9.2	31.0			53.4	1.9		0.4	2.7						
Stikine	1981	21,551	663				9.6	3.6			82.4	1.8			2.6						
River	1982	15,397	964			0.1	2.3	15.3			69.6	1.7			11.0						
	1983	15,857	2,035		0.7		1.1	12.1		0.1	78.7	1.8		0.2	5.3						
	1985	17,093	3,212		0.4	<0.1	3.9	5.3	<0.1	<0.1	84.4	1.3		0.3	4.2	<0.1		<0.1	0.1		
	1986	12,411	1,841		1.1	0.1	1.7	11.2			77.5	2.8		0.2	5.4						
	1987	6,138	2,206		1.5	0.2	8.6	17.4	<0.1		61.9	2.6		0.4	7.1	<0.1		<0.1	0.1		
	1988	12,736	2,603	0.1	2.9		6.6	29.1	<0.1	<0.1	52.1	5.1		0.1	3.9	0.1					
111	1981	49,942	1,400		0.4	0.1	1.8	7.4		<0.1	81.1	2.5		0.5	6.2						
Taku	1982	83,479	2,899		0.1		2.6	11.9		<0.1	75.4	2.9		0.2	6.8	<0.1			<0.1		
Inlet	1983	31,627	5,168		0.2		6.4	7.6	<0.1	0.1	68.8	5.7		0.3	10.9			<0.1	<0.1		
	1984	77,329	5,534		0.2	<0.1	12.3	4.4		<0.1	73.0	4.6		0.3	5.1			0.1	<0.1		
	1985	88,192	6,659		1.3	0.1	5.0	5.6	<0.1	0.5	71.8	3.6		0.7	11.3			0.1			
	1986	68,836	6,683		0.5	<0.1	12.8	11.3	<0.1	0.1	61.5	1.4		0.3	11.9	<0.1		0.1	0.1		
	1987	75,035	5,635		0.1		10.2	4.7	<0.1	<0.1	76.5	1.2		0.2	7.1	<0.1		<0.1	<0.1		
	1988	39,168	5,285		0.9	0.1	9.8	16.3		0.1	61.4	4.3		0.7	6.4	<0.1		<0.1			
111	1981	10,922	663		0.6	0.3	2.5	11.4		0.1	72.3	4.7		0.7	7.4						
Canada	1983	17,056	1,626		0.5		10.3	11.9			64.9	6.3		0.1	6.0				<0.1		
Taku	1984	27,242	1,551		1.1		15.5	6.8		<0.1	65.4	6.3		0.1	4.8						
River	1985	14,244	742		3.3		5.2	9.5	0.1	0.4	69.9	3.5		0.8	7.2			0.1			
	1986	14,739	1,225		2.2	0.1	14.3	10.8		0.2	61.0	0.9		0.1	10.4						
	1987	13,554	1,053		0.6	0.1	20.1	7.3	0.2	0.2	66.1	1.0		0.1	4.3	0.1					
	1988	12,014	988	0.1	2.2	0.3	13.2	23.2		0.1	52.3	2.3		0.5	5.8						
115	1981	93,195	3,665		0.1		1.1	2.6	0.1		53.9	12.3		0.1	29.3	0.1		0.1	0.5		0.1
Lynn	1982	273,536	5,346				0.3	5.0		<0.1	56.7	11.5		0.3	25.7	0.2			0.4		
Canal	1983	369,311	10,575		<0.1	<0.1	1.1	2.7		<0.1	55.1	7.2		0.2	33.6	0.1		<0.1	<0.1		
	1984	334,373	11,660		<0.1		1.3	1.8			76.1	8.0		0.1	12.6	<0.1		0.1	<0.1		
	1985	304,006	10,568		0.1	<0.1	0.8	3.0	<0.1	<0.1	51.2	8.4		1.0	35.2	0.1		0.1	<0.1		
	1986	290,205	10,606		0.2		1.8	3.6		<0.1	35.7	17.9		0.2	39.7	0.7		0.1	0.1		
	1987	415,815	11,426		<0.1	<0.1	1.5	5.0		<0.1	61.4	5.1		0.1	26.6	0.1		0.1	0.1		
	1988	351,551	11,062		<0.1		1.5	6.3	<0.1	<0.1	67.5	5.9		0.3	18.0	0.1		0.1	0.1		

Appendix B.2. Age composition of sockeye salmon in the commercial purse seine harvests in Southeast Alaska by district, 1981 to 1988.

District	Year	Catch	Sample Size	Percent by Age Class																
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	1.5	2.4	3.3	4.2
101	1982	73,817	1,486			0.1		13.5			76.0	7.1			3.3					
	1983	47,912	1,847			0.1	0.4	35.7	0.5		45.3	9.7		0.2	8.0	0.1			<0.1	
	1984	81,654	3,440		0.1	0.9	0.3	30.1	0.7		41.2	16.1		0.1	10.5					
	1985	125,638	4,049		<0.1	0.5	0.2	15.3	0.6	<0.1	58.7	11.3		0.5	12.5			0.1		
	1986	74,745	4,538		0.2	0.2	0.2	23.2	0.2	<0.1	45.0	16.2	<0.1	0.3	14.0	0.3	<0.1	<0.1	<0.1	
	1987	43,329	2,620		<0.1	0.9	0.5	9.9	0.3		66.4	11.8		0.3	9.7	0.1		<0.1		
	1988	32,675	2,079		0.2	0.4	0.1	54.8	0.6		21.1	17.6		0.4	4.9	<0.1				
102	1982	22,747	772			0.1		20.2	0.4		51.3	16.8			10.2	0.8			0.1	
	1983	11,123	749		0.1	0.7		42.7	0.4		38.7	8.4		0.4	8.6					
	1984	21,417	1,097			0.4	0.1	29.0	0.8		49.1	11.6		0.1	8.9					
	1985	34,746	698			0.3	0.6	29.6			55.1	10.7		0.1	3.6					
	1986	32,684	699		0.1	0.4	0.1	32.9	0.2		35.0	21.1		0.4	9.8	0.2				
	1987	17,476	1,335		0.1	0.5	0.5	16.8	0.5		53.2	8.7		0.2	19.0				0.5	
	1988	14,798	747			0.3	0.6	52.1	0.4		27.3	14.3			5.0					0.1
104	1981	288,548	342		0.3	0.3	0.3	64.3			21.9	11.1			1.8					
	1982	285,231	2,365		<0.1			15.4	0.1	0.1	73.3	7.3		<0.1	3.6	<0.1		<0.1	<0.1	
	1983	650,807	6,566		0.1	0.5	0.2	39.6	0.1	<0.1	45.8	8.2		<0.1	5.4	<0.1				
	1984	293,668	4,558		0.1	0.4	0.3	50.8	0.1		33.4	11.4			3.4	0.1				
	1985	431,575	4,576		0.1	0.2	0.2	22.7	0.3	<0.1	64.2	7.1			5.1	0.1			<0.1	
	1986	443,990	6,507		<0.1	0.4	0.2	31.5	0.3		46.8	10.2		0.2	10.1	0.1	<0.1	<0.1	<0.1	
	1987	171,214	3,878		0.2	4.3	0.3	23.3	1.1		53.3	9.8		0.1	7.7	<0.1			0.1	
	1988	591,285	8,850		0.1	0.7	0.2	66.9	0.4	<0.1	21.6	7.6		<0.1	2.4	<0.1				
112	1982	26,387	1,529		0.3	0.8	0.6	31.8	0.2		21.6	18.2		0.2	26.3					
	1983	25,940	2,262		0.4	<0.1	9.2	26.7	0.1		47.8	11.4			4.5	<0.1				
	1984	22,295	2,620		0.2	<0.1	4.6	6.6	0.1	<0.1	57.0	20.5		<0.1	10.8	0.1			0.1	
	1985	37,121	1,969		1.0	0.9	4.3	12.3	0.6	0.5	34.2	22.1	0.1	0.4	23.3	0.1		0.2		
	1986	8,377	754		0.5	0.2	6.8	27.4			34.3	11.4		0.3	18.5	0.6				
	1987	44,766	2,853	<0.1	0.3	0.6	8.3	8.2	0.5	0.1	61.6	6.6		0.3	13.1	<0.1		<0.1	0.2	
	1988	3,861	518		0.5	0.7	1.9	46.6	0.4		31.7	13.0		0.4	4.7			0.1		
113-34	1982		764					1.4	0.1			76.2		0.1	0.9	21.3				
	1983	15,736	348								20.4	75.9				3.7				
	1984	15,105	801					27.2	0.2		0.4	72.0	0.1		0.1					
	1985	2,348	362					10.8				79.5				9.7				
	1986	4,097	259			0.4		10.0	0.8			84.2	0.4		0.8	3.5				
	1987	4,813	411					3.9	1.9			92.7	1.0		0.2	0.2				

Appendix B.3. Age composition of sockeye salmon in selected escapements to Southeast Alaska, 1981 to 1988.

System	Stream Number	Year	Sample Size	Percent by Age Class															
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	1.5	2.4	3.3
Hugh Smith Lake	101-30-075	1981	1,137			1.6		46.1			30.0	11.6			10.7				
		1982	3,009				0.0	2.9			90.5	1.6			5.0				
		1983	1,107			0.1	0.2	13.8	0.1		51.4	5.4		2.0	27.0				
		1984	1,591			0.1		7.4			62.7	3.8			26.0				
		1985	1,170					0.8	0.1		70.5	0.6		0.5	26.3			0.2	1.0
		1986	1,934		0.1	0.2		65.5			11.6	18.0		0.6	4.0		0.1		
		1987	3,888			0.5		1.9	0.4		88.7	3.1		0.1	5.2	0.1			0.2
		1988	2,980			0.1		37.9	0.1		20.7	24.3		1.3	15.6				<0.1
McDonald Lake	101-80-068	1981	745			0.4		3.3			74.6	2.2			19.2				0.3
		1982	629			0.3		4.8	0.3		73.4	8.6		0.2	12.4				
		1983	1,366				0.2	34.9	0.1		19.5	3.3			42.0				
		1984	929			0.1	0.1	14.6			67.8	6.4			11.0				
		1985	537					4.6			72.3	8.7			14.2				0.2
		1986	564				0.2	11.7	0.5		56.2	3.7			27.7				
		1987	835			0.4		7.7	0.8		59.6	2.2			29.2	0.1			
		1988	1,069			0.3		19.5			64.1	5.8		0.1	10.3				
Karta River	102-60-087	1981	355			0.6		31.3			58.3	1.7			7.3	0.3			0.6
		1982	1,429					5.0			92.4	1.7		0.1	0.8				
		1983	921					2.5			85.2	2.5		0.1	9.7				
		1984	224			3.6		12.9	0.9		74.1	3.1			5.4				
		1985	1,851					1.9			81.1	1.1		0.3	15.5	0.1		0.1	
		1986	446					4.0			78.7	1.6		0.9	14.4			0.4	
		1987	3,534				0.2	5.1			85.7	1.4		0.2	7.4	<0.1		<0.1	0.1
		1988	1,343				<0.1	31.2		<0.1	56.5	5		1.8	5.1			0.3	
Sarkar Lake	103-90-014	1982	538					20.4			38.9	37.9			2.6				0.2
		1983	140					35.0			19.3	30.0			15.7				
		1984	316			1.3		63.6	2.8		14.9	13.0			4.1	0.3			
		1985	457			1.5		7.9	3.1		38.3	29.1			16.8	1.3			2.0
		1986	371			1.3		33.4	1.3		5.4	51.5			6.7	0.3			
		1987	76			6.6		28.9	6.6		13.2	39.5			5.3				
		1988	194					44.8	3.6		8.2	29.4			13.4				0.5
Salmon Bay Lake	106-41-010	1981	315			0.3		8.9	0.6		85.7	1.9		0.3	2.3				
		1982	1,302			1.4		15.4	0.1		74.1	6.6		0.1	2.3				
		1983	527			12.0		34.1	0.6		38.9	6.8			7.6				
		1984	592			0.3		48.4			50.3	0.2			0.8				
		1985	1,342			0.5		6.5	0.1		84.3	1.9			6.7				
		1986	1,257		0.1	0.1		25.1	0.1		60.6	5.6		0.7	7.3				
		1987	2,092			7.6	0.1	7.6	1.3		72.9	3.1	<0.1	0.1	6.4	0.9			
		1988	2,079			0.4		84.1	0.3		9.6	2.9		0.3	2.5				
Tahltan Lake	108-80-110	1981	914					4.9			92.0	1.8			1.3				
		1982	441					4.1			78.0	0.2		0.2	17.5				
		1983	1,885			0.0		2.2			91.2	0.1		0.1	6.4				
		1984	1,928					33.3			60.6	1.2		0.1	4.8			0.0	
		1985	2,307					2.4			95.4	0.3			1.9				
		1986	719					1.0			89.9	1.1			8.0				
		1987	797					1.3			86.0	1.7		0.1	10.5				0.3
		1988	697					31.5			54.6	2.8		0.4	10.7				0.1

-Continued-

Appendix B.3. (page 2 of 2).

System	Stream Number	Year	Sample Size	Percent by Age Class															
				0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	1.5	2.4	3.3
Taku River Canyon Island	111-32-032	1983	1,297		0.1		5.3	12.3			66.7	7.8		0.2	7.6				
		1983	277		1.8		7.2	36.5			42.2	6.1			5.8				0.4
		1984	1,579	0.2	2.3	1.0	10.5	16.3	0.0	0.2	60.5	6.6		0.2	2.2				
		1985	2,436	0.3	5.7	3.9	3.8	17.1	0.4	0.3	54.2	8.7		0.7	4.8			0.1	
		1986	3,389		2.8	0.5	7.8	28.8	0.1		50.2	2.1		0.3	7.5				
		1987	2,987	0.9	0.8	5.2	9.7	18.0	1.5	0.2	56.3	3.0		0.1	4.3			<0.1	
		1988	2,450	0.3	6.5	6.2	8.0	29.8	0.3		38.7	5.6		0.1	4.6	0.1			
Kuthai Lake	111-32-235	1981	265					11.3			86.4	0.8			1.5				
		1982	219					21.4			73.1				5.5				
		1983	486					1.7			96.5	0.8			1.0				
		1984	242					50.8			47.5				1.7				
		1986	73					57.5			38.4	2.7			1.4				
		1987	26			7.7	7.7	23.1			57.7				3.8				
		1988	375					42.9			46.4	2.9			7.7				
Little Trapper Lake	111-32-245	1981	272			1.5		8.1			85.7	4.0			0.7				
		1982	611			0.3	0.2	8.5			75.2	1.6			14.2				
		1983	639			0.9		50.9			29.0	0.9			18.3				
		1984	1,323					5.1			91.3	2.5		0.2	0.9				
		1985	1,416					14.4			74.8	3.6		0.9	6.3				
		1986	671				0.1	5.5			77.5	1.3			15.5				
		1987	714			0.2		11.8			78.6	0.6			8.8				
		1988	692				0.1	10.6			71.8	7.0			10.5				
Speel Lake	111-33-034	1981	187			25.1		21.9			50.8	1.6			0.5				
		1982	312			3.5		55.5			39.8			0.3	0.9				
		1983	793		0.4	1.3	0.3	24.3	0.0		70.3	1.2		0.0	2.2				
		1984	765				1.7	41.4			54.9	1.0			1.0				
		1985	396			7.6		23.7			66.9	1.0		0.3	0.5				
		1986	872		0.2		0.2	47.6			48.1	0.8		0.1	3.1				
		1987	1,341				1.2	3.9			93.3	0.1			1.6				
		1988	659			0.1		40.8			49.9	7.3		0.1	1.7				
Crescent Lake	111-35-006	1981	458			13.5		15.3	0.4		60.7	0.7			9.4				
		1982	323			2.5		40.3	0.9		52.6	2.8			0.9				
		1983	1,684		2.7	2.3	0.4	62.3	0.0		20.2	3.6		0.0	8.5				
		1984	1,140		0.1	0.1	4.0	9.9			81.1	0.9		0.4	3.3			0.2	
		1985	1,303		0.2	0.1	1.3	5.9		0.6	83.2	1.4		2.9	4.2			0.1	0.1
		1986	826		0.2		0.4	15.7		0.1	73.2	0.9		0.7	8.7				
		1987	2,548				1.4	0.4			91.3	0.3		0.5	6.1				<0.1
		1988	412					22.4		0.5	32.2	5.9		24.7	13.4				
Chilkat Lake	115-32-032	1981	597			0.2		3.0	0.3		52.4	7.9			35.8				0.3
		1982	1,632			0.4	0.1	1.9	2.7		9.8	47.7			35.8	1.5			0.1
		1983	2,862			0.8		3.0	3.1		31.6	33.1		0.0	28.1	0.2		0.0	0.1
		1984	2,728			0.1	0.0	1.6	1.5		22.7	53.5		0.1	20.2	0.2		0.0	0.0
		1985	1,332			0.8		0.7	3.5		11.1	38.8	0.2	0.3	44.3	0.4			
		1986	940					6.2	1.0		3.5	24.9			62.2	1.6			0.5
		1987	1,461			1.5		1.9	3.2		24.1	36.0			32.4	0.7		<0.1	0.1
		1988	1,918				<0.1	0.5			21.7	12.8		0.1	64.6	0.2		<0.1	0.1
Chilkoot Lake	115-33-020	1981	1,186			0.0		10.4			80.2	1.7		0.3	7.4				
		1982	1,691				0.2	19.2			78.1	0.5		1.0	1.0				
		1983	1,791			0.1		12.5	0.1		60.8	1.4		0.2	24.9				
		1984	1,902					4.6			85.5	0.4		1.0	8.5				
		1985	1,622			0.1		12.1			66.6	2.6		2.4	15.8	0.1		0.3	
		1986	2,147			0.1		12.9			67.2	2.4		0.6	16.7			0.1	0.1
		1987	2,207					8.3			66.0	2.2		0.3	23.0			0.1	0.1
		1988	2,661					4.0			78.1	2.6		1.3	13.6			0.4	0.1

Appendix C.1. Migratory timing statistics of sockeye salmon harvested in the District 101 gill net fishery by age class, 1988.

Stat Week	Age Class 0.2	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	Total
26.0	0.708	0.600	0.031	0.000	0.000	0.155	0.084	0.455	0.188	0.000	0.455	0.105
27.0	1.000	0.856	0.202	1.000	1.000	0.495	0.379	0.455	0.462	0.000	0.455	0.376
28.0	1.000	0.949	0.342	1.000	1.000	0.695	0.643	0.455	0.616	1.000	0.455	0.577
29.0	1.000	0.963	0.488	1.000	1.000	0.794	0.791	1.000	0.743	1.000	1.000	0.708
30.0	1.000	0.990	0.601	1.000	1.000	0.840	0.867	1.000	0.827	1.000	1.000	0.785
31.0	1.000	1.000	0.684	1.000	1.000	0.879	0.888	1.000	0.867	1.000	1.000	0.829
32.0	1.000	1.000	0.924	1.000	1.000	0.968	0.952	1.000	0.953	1.000	1.000	0.950
33.3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	26.3	26.6	29.8	27.0	27.0	28.2	28.4	27.6	28.4	28.0	27.6	28.7
Date	6/24	6/26	7/19	6/29	6/29	7/7	7/8	7/3	7/8	7/6	7/3	7/11
Var.	0.21	1.03	4.55	0.00	0.00	3.88	3.48	2.23	4.41	0.00	2.23	4.40
SD	0.45	1.01	2.13	0.00	0.00	1.97	1.86	1.49	2.10	0.00	1.49	2.10

Appendix C.2. Migratory timing statistics of sockeye salmon harvested in the District 106-30 (upper Clarence Strait) gill net fishery by age class, 1988.

Stat Week	Age Class 0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
26.8	0.231	0.000	0.066	0.081	0.000	0.103	0.105	0.391	0.068	0.000	0.000	0.000	0.094
28.0	0.231	0.000	0.180	0.154	0.000	0.179	0.211	0.609	0.177	0.000	0.000	0.000	0.177
29.0	0.846	0.000	0.530	0.340	0.000	0.488	0.484	0.609	0.503	0.000	0.000	0.000	0.455
30.0	0.846	0.000	0.825	0.531	0.000	0.733	0.676	0.913	0.732	0.000	0.000	0.000	0.679
31.0	1.000	1.000	0.891	0.627	0.000	0.824	0.752	1.000	0.813	0.000	0.308	1.000	0.769
32.0	1.000	1.000	0.973	0.840	0.517	0.961	0.887	1.000	0.948	1.000	0.308	1.000	0.922
34.1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	28.8	31.0	29.6	30.6	33.0	29.7	30.0	28.4	29.8	32.0	33.1	31.0	30.0
Date	7/12	7/27	7/17	7/24	8/10	7/18	7/20	7/8	7/19	8/3	8/11	7/27	7/20
Var.	1.69	0.00	2.13	4.60	1.10	2.90	4.29	2.40	2.92	0.00	2.05	0.00	3.58
SD	1.30	0.00	1.46	2.14	1.05	1.70	2.07	1.55	1.71	0.00	1.43	0.00	1.89

Appendix C.3. Migratory timing statistics of sockeye salmon harvested in the District 106-41 (Sumner Strait) gill net fishery by age class, 1988.

Stat Week	Age Class 0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	3.3	Total
26.0	0.000	0.000	0.011	0.021	0.000	0.034	0.021	0.000	0.033	0.000	0.107	0.030
27.0	0.183	1.000	0.176	0.107	0.000	0.148	0.132	0.110	0.077	0.000	0.107	0.130
28.0	0.183	1.000	0.327	0.192	0.300	0.248	0.271	0.294	0.192	0.000	0.107	0.232
29.0	0.423	1.000	0.639	0.434	0.300	0.528	0.513	0.490	0.399	0.000	1.000	0.493
30.0	0.760	1.000	0.948	0.556	0.867	0.725	0.633	0.557	0.678	0.000	1.000	0.673
31.0	0.894	1.000	1.000	0.701	0.867	0.885	0.813	0.894	0.809	0.000	1.000	0.828
32.0	1.000	1.000	1.000	0.888	0.867	0.977	0.943	0.984	0.953	0.550	1.000	0.950
33.2	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	29.6	27.0	28.9	30.1	29.8	29.5	29.7	29.7	29.9	32.5	28.7	29.7
Date	7/17	6/29	7/12	7/21	7/19	7/16	7/18	7/18	7/19	8/7	7/11	7/18
Var.	2.25	0.00	1.41	3.72	2.54	2.72	3.32	2.67	2.76	0.36	0.86	3.09
SD	1.50	0.00	1.19	1.93	1.59	1.65	1.82	1.64	1.66	0.60	0.93	1.76

Appendix C.4. Migratory timing statistics of sockeye salmon harvested in the Canadian inriver gill net fishery on the Stikine River by age class, 1988.

Stat Week	Age Class 0.1	0.2	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	Total
27.0	0.000	0.008	0.017	0.020	0.000	0.000	0.034	0.035	0.125	0.098	0.000	0.031
28.0	0.000	0.036	0.051	0.060	0.000	0.000	0.083	0.080	0.125	0.152	0.000	0.075
29.0	0.000	0.060	0.103	0.105	0.000	0.333	0.119	0.111	0.375	0.222	0.000	0.116
30.0	0.385	0.184	0.251	0.307	0.000	0.333	0.264	0.334	1.000	0.451	0.000	0.285
31.0	1.000	0.379	0.504	0.502	1.000	1.000	0.489	0.525	1.000	0.609	0.000	0.498
32.0	1.000	0.824	0.805	0.777	1.000	1.000	0.824	0.846	1.000	0.886	0.000	0.813
33.0	1.000	0.923	0.967	0.926	1.000	1.000	0.949	0.946	1.000	0.958	0.667	0.943
34.4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	30.6	31.6	31.3	31.3	31.0	30.3	31.3	31.1	29.4	30.6	33.5	31.3
Date	7/24	7/31	7/29	7/29	7/27	7/22	7/29	7/28	7/15	7/24	8/14	7/29
Var.	0.24	1.95	2.16	2.68	0.00	0.89	2.63	2.64	0.98	3.48	0.44	2.65
SD	0.49	1.40	1.47	1.64	0.00	0.94	1.62	1.62	0.99	1.87	0.66	1.63

Appendix C.5. Migratory timing statistics of sockeye salmon harvested in the District 111 gill net fishery by age class, 1988.

Stat Week	Age Class 0.2	1.1	0.3	1.2	0.4	1.3	2.2	1.4	2.3	3.2	2.4	Total
26.0	0.000	0.000	0.010	0.119	0.000	0.072	0.049	0.032	0.052	0.000	0.000	0.070
27.0	0.104	0.000	0.060	0.382	0.000	0.180	0.132	0.093	0.131	0.000	0.000	0.194
28.0	0.203	0.000	0.115	0.474	0.000	0.293	0.248	0.121	0.206	0.000	1.000	0.295
29.0	0.299	0.000	0.255	0.588	0.143	0.462	0.371	0.439	0.372	0.000	1.000	0.451
30.0	0.836	0.000	0.565	0.708	0.143	0.735	0.478	0.696	0.520	0.000	1.000	0.689
31.0	0.910	0.000	0.771	0.798	0.143	0.833	0.584	0.807	0.649	0.000	1.000	0.797
32.0	0.982	0.000	0.882	0.854	0.381	0.896	0.700	0.911	0.740	0.278	1.000	0.869
33.0	1.000	1.000	0.932	0.917	0.381	0.939	0.793	0.954	0.845	0.278	1.000	0.922
34.6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	29.7	33.0	30.5	29.2	33.2	29.6	30.8	30.0	30.6	33.9	28.0	29.8
Date	7/18	8/10	7/24	7/14	8/11	7/17	7/26	7/20	7/24	8/16	7/6	7/19
Var.	1.84	0.00	3.30	6.77	4.08	4.63	7.32	3.39	6.39	1.36	0.00	5.26
SD	1.36	0.00	1.82	2.60	2.02	2.15	2.70	1.84	2.53	1.16	0.00	2.29

Appendix C.6. Migratory timing statistics of sockeye salmon harvested in the Canadian inriver gill net fishery on the Taku River by age class, 1988.

Stat Week	Age Class 0.1	0.2	1.1	0.3	1.2	0.4	1.3	2.2	1.4	2.3	Total
27.0	0.000	0.000	0.000	0.008	0.278	0.000	0.131	0.215	0.000	0.133	0.146
28.0	0.000	0.022	0.000	0.032	0.353	0.000	0.188	0.359	0.097	0.216	0.206
29.0	0.000	0.022	0.000	0.151	0.548	0.000	0.436	0.533	0.484	0.621	0.427
30.0	0.000	0.368	0.000	0.308	0.677	1.000	0.645	0.763	0.484	0.732	0.607
31.0	0.000	0.487	0.000	0.492	0.793	1.000	0.789	0.881	1.000	0.918	0.752
32.0	0.000	0.699	0.242	0.632	0.840	1.000	0.855	0.941	1.000	0.930	0.824
33.0	1.000	0.877	0.242	0.787	0.914	1.000	0.907	0.970	1.000	0.964	0.896
34.5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	33.0	31.6	33.9	31.7	29.6	30.0	30.1	29.4	29.9	29.5	30.2
Date	8/10	7/31	8/16	8/1	7/17	7/20	7/21	7/16	7/19	7/17	7/21
Var.	0.00	2.63	1.15	3.86	5.58	0.00	4.41	3.49	1.29	2.95	4.93
SD	0.00	1.62	1.07	1.97	2.36	0.00	2.10	1.87	1.13	1.72	2.22

Appendix C.7. Migratory timing statistics of sockeye salmon harvested in the District 115 gill net fishery by age class, 1988.

Stat Week	Age Class 0.2	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3	Total
26.0	0.000	0.028	0.005	0.000	0.253	0.028	0.008	0.043	0.011	0.000	0.000	0.000	0.023
27.0	0.000	0.213	0.028	0.382	0.705	0.082	0.031	0.121	0.028	0.000	0.051	0.000	0.068
28.0	0.000	0.429	0.092	0.382	1.000	0.162	0.077	0.248	0.055	0.000	0.051	0.000	0.138
29.0	0.614	0.656	0.213	0.382	1.000	0.287	0.111	0.325	0.110	0.000	0.051	0.000	0.246
30.0	1.000	0.705	0.296	0.382	1.000	0.379	0.143	0.398	0.149	0.000	0.051	0.000	0.323
31.0	1.000	0.843	0.496	0.382	1.000	0.562	0.268	0.609	0.264	0.000	0.192	0.000	0.490
32.0	1.000	0.915	0.695	0.382	1.000	0.703	0.364	0.698	0.375	0.000	0.431	0.241	0.625
33.0	1.000	0.960	0.879	0.382	1.000	0.853	0.595	0.808	0.575	0.000	0.577	0.537	0.790
34.0	1.000	0.978	0.916	1.000	1.000	0.898	0.727	0.900	0.676	0.170	0.822	0.537	0.849
35.0	1.000	0.997	0.970	1.000	1.000	0.967	0.832	0.945	0.810	0.670	0.883	0.660	0.931
36.0	1.000	0.997	0.994	1.000	1.000	0.993	0.938	0.963	0.916	0.765	0.883	0.852	0.975
37.0	1.000	0.998	0.999	1.000	1.000	0.998	0.975	0.995	0.965	0.940	0.985	0.887	0.991
38.4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	29.4	29.3	31.4	31.3	27.0	31.1	32.9	30.9	33.1	35.5	33.0	34.3	31.6
Date	7/16	7/15	7/30	7/29	6/29	7/28	8/9	7/26	8/11	8/28	8/10	8/19	7/31
Var.	0.24	4.49	4.43	11.57	0.55	6.07	6.63	7.80	7.01	1.43	5.19	4.55	6.93
SD	0.49	2.12	2.10	3.40	0.74	2.46	2.58	2.79	2.65	1.20	2.28	2.13	2.63

Appendix C.8. Migratory timing statistics of sockeye salmon harvested in the District 101 purse seine fishery by age class, 1988.

Stat Week	Age Class 0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	Total
28.0	0.057	0.026	0.115	0.016	0.036	0.043	0.056	0.022	0.024	0.000	0.030
29.0	0.698	0.123	1.000	0.131	0.153	0.294	0.210	0.274	0.235	0.000	0.187
30.0	0.698	0.123	1.000	0.206	0.153	0.425	0.295	0.511	0.288	0.000	0.274
31.0	1.000	0.123	1.000	0.376	0.235	0.583	0.495	0.630	0.534	1.000	0.449
32.3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	29.5	31.9	28.9	31.5	31.7	30.8	31.1	30.7	31.1	31.0	31.2
Date	7/17	8/2	7/12	7/31	8/1	7/26	7/28	7/25	7/28	7/27	7/28
Var.	0.96	1.35	0.10	1.53	1.66	2.18	2.05	1.96	1.90	0.00	1.86
SD	0.98	1.16	0.32	1.24	1.29	1.48	1.43	1.40	1.38	0.00	1.36

Appendix C.9. Migratory timing statistics of sockeye salmon harvested in the northern portion of the District 104 purse seine fishery by age class, 1988.

Stat Week	Age Class 0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	Total
28.7	0.000	0.054	0.600	0.143	0.111	0.385	0.321	1.000	0.369	1.000	0.208
30.0	0.358	0.054	0.680	0.253	0.230	0.531	0.428	1.000	0.558	1.000	0.326
31.0	0.358	0.054	0.753	0.288	0.230	0.556	0.457	1.000	0.601	1.000	0.358
32.0	0.358	0.559	0.929	0.804	0.492	0.882	0.816	1.000	0.871	1.000	0.818
33.0	1.000	0.840	1.000	0.951	0.810	0.964	0.948	1.000	0.947	1.000	0.952
34.0	1.000	0.879	1.000	0.972	0.891	0.981	0.971	1.000	0.977	1.000	0.973
35.2	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	31.9	32.6	29.9	31.6	32.2	30.6	31.0	28.7	30.6	28.7	31.3
Date	8/2	8/7	7/19	7/31	8/4	7/24	7/27	7/11	7/24	7/11	7/29
Var.	2.07	1.94	2.41	2.35	3.40	3.16	3.41	0.00	3.20	0.00	2.79
SD	1.44	1.39	1.55	1.53	1.84	1.78	1.85	0.00	1.79	0.00	1.67

Appendix C.10. Migratory timing statistics of sockeye salmon harvested in the southern portion of the District 104 purse seine fishery by age class, 1988.

Stat Week	Age Class 0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
28.0	0.000	0.000	0.030	0.030	0.034	1.000	0.071	0.117	0.000	0.064	0.048
29.0	0.770	0.578	0.794	0.211	0.475	1.000	0.518	0.486	1.000	0.459	0.321
30.0	0.770	0.578	1.000	0.510	0.475	1.000	0.744	0.650	1.000	0.735	0.589
31.0	0.770	0.650	1.000	0.609	0.475	1.000	0.803	0.710	1.000	0.822	0.674
32.0	1.000	0.880	1.000	0.816	1.000	1.000	0.909	0.857	1.000	0.925	0.847
33.0	1.000	0.880	1.000	0.918	1.000	1.000	0.956	0.916	1.000	0.964	0.929
34.0	1.000	0.941	1.000	0.954	1.000	1.000	0.979	0.964	1.000	0.964	0.962
35.0	1.000	0.973	1.000	0.989	1.000	1.000	0.995	0.994	1.000	0.994	0.991
36.0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	29.7	30.5	29.2	31.0	30.5	28.0	30.0	30.3	29.0	30.1	30.6
Date	7/18	7/24	7/14	7/27	7/24	7/6	7/20	7/22	7/13	7/21	7/24
Var.	1.59	4.05	0.20	3.07	2.39	0.00	2.59	3.65	0.00	2.47	3.15
SD	1.26	2.01	0.45	1.75	1.54	0.00	1.61	1.91	0.00	1.57	1.77

Appendix C.11. Migratory timing statistics of sockeye salmon harvested in the District 109 purse seine fishery by age class, 1988.

Stat	Age Class														
Week	0.1	0.2	1.1	0.3	1.2	2.1	1.3	3.1	2.2	1.4	2.3	3.2	3.3	4.2	Total
29.8	0.000	0.000	0.286	0.000	0.795	0.433	0.565	0.301	0.000	0.000	0.424	0.000	0.000	0.000	0.630
31.3	0.000	1.000	0.400	0.395	0.853	0.657	0.794	0.511	0.000	0.444	0.613	0.389	0.583	0.000	0.767
33.0	1.000	1.000	0.857	1.000	0.958	0.925	0.948	0.798	1.000	0.444	0.921	0.667	1.000	1.000	0.928
34.6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	33.0	31.3	32.1	32.3	30.4	31.4	30.9	32.0	33.0	33.1	31.4	32.9	32.0	33.0	30.9
Date	8/10	7/29	8/4	8/5	7/23	7/30	7/26	8/3	8/10	8/11	7/30	8/9	8/3	8/10	7/26
Var.	0.00	0.00	2.85	0.69	1.78	2.56	2.11	3.21	0.00	2.69	2.68	1.96	0.70	0.00	2.48
SD	0.00	0.00	1.69	0.83	1.33	1.60	1.45	1.79	0.00	1.64	1.64	1.40	0.84	0.00	1.57

Appendix C.12. Migratory timing statistics of sockeye salmon harvested in the District 112 purse seine fishery by age class, 1988.

Stat	Age Class										
Week	0.2	1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	2.4	Total
28.6	0.000	0.000	0.573	0.537	0.000	0.639	0.339	1.000	0.235	0.000	0.522
30.3	0.444	0.000	0.733	0.615	0.000	0.792	0.419	1.000	0.279	1.000	0.626
33.0	0.611	0.214	1.000	0.680	0.563	0.872	0.613	1.000	0.552	1.000	0.729
34.8	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total	32.5	34.4	30.0	31.0	33.8	30.0	32.0	28.6	32.7	30.3	30.9
Date	8/7	8/20	7/20	7/27	8/16	7/20	8/3	7/10	8/8	7/22	7/26
Var.	4.25	0.55	3.54	8.01	0.80	4.94	7.38	0.00	6.20	0.00	7.38
SD	2.06	0.74	1.88	2.83	0.89	2.22	2.72	0.00	2.49	0.00	2.72